

MAG REGIONAL TRANSPORTATION PLAN

Phase 1

Draft Summary Report



*Mobility for the
New Millennium*

February 2003



MARICOPA
ASSOCIATION of
GOVERNMENTS

Regional Transportation Plan – Phase 1

SUMMARY REPORT

Prepared for:



Prepared by:



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PREFACE

This document is one of a series of reports and documents that have been prepared for the MAG Regional Transportation Plan – Phase 1 project. There are five published documents that were produced as final products of specific tasks. These five documents form the basis of the **Summary Report**. The five task reports are:

**Status of Regional Transportation
Values, Goals and Objectives
Alternative Growth Concepts
Analysis of Alternative Growth Concepts
Transportation Planning Principles**

In addition to the above documents, several other products from RTP Phase 1 are available in the project files. These products provide documentation of the major steps taken in the project and provide input to the five documents listed above and the final report.

❑ **Issue Papers:**

- Demographics and Social Change
 - New Economy
 - Environmental and Resource
 - Land Use and Urban Development
 - Transportation Modes and Technologies
- ❑ Five forums were held in February and March 2001 with presentations by nationally recognized experts in the five categories listed above under Issue Papers. **Videos** were made of most of the forums, and a presentation was prepared identifying the major themes of the forums.
- ❑ Sixteen focus group meetings were held in May and June 2001. The groups included various geographic, ethnic and agency orientations. A summary is provided in the **Focus Groups Results** task paper dated August 2001.
- ❑ Interviews were held with 21 resource and agency stakeholders throughout the metropolitan area. The findings from these interviews were documented in a task paper dated October 2001.
- ❑ The **Population Projections** task paper dated September 19, 2001, was prepared to provide the “horizon” projections to be used in the analyses for this RTP.
- ❑ A task paper entitled **Summary of Research and Transportation Model Adjustments for Vehicle Trip Reductions** dated March 27, 2002, was prepared to assist in determining potential traffic impacts of trip reduction actions.

1.0 INTRODUCTION

The Maricopa Association of Governments (MAG) is preparing a new Regional Transportation Plan (RTP) that will replace the current Long Range Transportation Plan as the policy framework to guide transportation investments in the region over the next 50 years. The RTP will encompass all modes of transportation, including roadways, public transit, rail, bicycles, pedestrians and aviation.

This document summarizes Phase 1 of the RTP, which focuses on defining policies, goals and alternative scenarios for regional growth and transportation investments. Phase 2, now underway, will identify specific improvements to address long-range transportation needs in Maricopa County.

The remaining nine chapters of this report are organized as follows:

Chapter 2.0, Expert Panel Forums and Issue Papers—Briefly describes five expert panel forums and summarizes research papers on key regional issues that kicked off the study in early 2001.

Chapter 3.0, Subregional Focus Groups—Highlights the findings from 16 focus groups of community leaders and stakeholders.

Chapter 4.0, Existing Transportation Systems—Summarizes existing roadway, transit and non-motorized systems in Maricopa County. (The source of Chapters 4.0, 5.0 and 6.0 is the Status of Regional Transportation Report developed as an element of Phase 1.)

Chapter 5.0, Programmed and Planned Improvements—Summarizes the nature and scope of programmed and planned transportation improvements in the region.

Chapter 6.0, Transportation System Characteristics and Improvements, 2001-2040—Describes expected changes in selected indicators of transportation demand, supply and performance indicators during the next 40 years.

Chapter 7.0, Values, Goals and Objectives—Lists draft values, goals and objectives currently under consideration by MAG for the regional transportation system.

Chapter 8.0, Alternative Growth Concepts—Defines four distinct long-range growth scenarios for Maricopa County, describes opportunities and constraints affecting implementation of each, and provides a general comparison of their likely impacts on the region and its transportation system.

Chapter 9.0, Long Range Transportation Needs—Attempts to quantify the long-range roadway and transit needs of the region, on the basis of current MAG forecasts.

Chapter 10.0, Transportation Planning Principles—Concludes Phase 1 by presenting a set of transportation planning principles that flow logically from the analysis completed by the MAG RTP planning team in previous tasks.

2.0 EXPERT PANEL FORUMS AND ISSUE PAPERS

During the early months of the RTP Phase 1 study, the MAG project team organized expert panel forums and prepared research papers on the following topics:

Demographics and Social Change

The New Economy

Environmental and Resource Issues

Land Use and Urban Development

Transportation and Technology

These five issue areas were selected because each will strongly influence, and in turn be influenced by, the future development of transportation systems in the MAG region.

2.1 Expert Panel Forums

To achieve a broad perspective on the issues and challenges facing one of the nation's fastest-growing urban areas during the next 50 years, MAG organized a series of five expert panel forums. These half-day public events were held on Friday mornings during February and March, 2001. A kick-off dinner on the evening before the first forum featured Dr. Anthony Downs of the Brookings Institution as keynote speaker.

As Table 2.1 indicates, each forum brought together a combination of national and regional experts, led by a moderator who opened the session. After a brief presentation by each panelist, opportunities were provided for an exchange of views among the experts, and for questions from the audience.

To assist and support the expert panels, the MAG project team prepared a research paper on each of the five topics prior to the forums. These papers were then revised to include information obtained from the panelists' presentations. The rest of this chapter summarizes highlights of the revised issue papers.

The full text of each issue paper is available on the MAG website. Sources are documented in the original papers, but omitted in the following summary to save space.

2.2 Demographics and Social Change

Strong population growth in Maricopa County is expected to continue. This rapid growth will continue to pose challenges for the entire region, including the urban core as well as the developing fringes. From 1990 to 2000, the population of Maricopa County increased 45%, from 2,122,000 to 3,072,000. This rapid growth is challenging the region's ability to provide adequate infrastructure, especially at the fringe where the fastest-growing cities are located.

As Table 2.2 shows, the population of Maricopa County is projected to be 6.3 million in 2040, an increase of approximately 3.2 million, or more than 100%, over the year 2000 population of 3.1 million. (New projections under development anticipate higher future population levels, with a 2040 projection of 7.4 million.) The number of cities with a population greater than 250,000 is expected to rise from two today to nine in 2040. Projections for "buildout" show Maricopa County with a population of approximately 13 million, which is equivalent to the third largest metropolitan area in the United States today (Chicago). Employment is projected to grow somewhat faster than population from 2000 to 2010,

but slower than population over the longer period from 2000 to 2040. The latter, long-range trend reflects the aging of the population.

Table 2.1: Expert Forums and Panelists

Forum	Panelists
<i>Demographics and Social Change:</i> 2/23/2001	Eric Anderson, MAG Anthony Downs, Brookings Institution Louis Oliva, Arizona State University Sandra Rosenbloom, University of Arizona Bruce Mosby, Greater Phoenix Black Chamber of Commerce (moderator)
<i>The New Economy:</i> 3/2/2001	Jeanette Harrison, Intel Tom Horan, Claremont Information and Technology Institute Joel Kotkin, Reason Public Policy Institute Jon Talton, Arizona Republic Mary Jo Waits, Arizona State University Rick Weddle, Greater Phoenix Economic Council (moderator)
<i>Environmental and Resource Issues:</i> 3/9/2001	David Feuerherd, Arizona Lung Association Roger Manning, Arizona Municipal Water Users Association Felicia Marcus, former EPA Region 9 Administrator Diana Mendes, BRW Inc. Charles Redman, Arizona State University Jack Pfister, ASU (moderator)
<i>Land Use and Urban Development:</i> 3/23/2001	Reid Ewing, Rutgers University Grady Gammage Jr., Gammage & Burnham Gary Garcyski, National Association of Home Builders John Landis, University of California at Berkeley John McNamara, BRW Inc. Kathryn Lincoln, Lincoln Institute of Land Policy (moderator)
<i>Transportation and Technology:</i> 3/30/2001	Mo Garfinkle, National Transportation Consultant Tom Larwin, San Diego Metropolitan Transit Development Board Robert McQueen, PBS & J Pitu Merchandani, University of Arizona Robert Skinner, Jr., Transportation Research Board Rick Pilgrim, BRW Inc. (moderator)

Table 2.2: Maricopa County Population and Employment Projections

Year	Population		Employment	
	Total	% Increase from 2000	Total	% Increase from 2000
2000	3,072,000	N/A	1,483,000	N/A
2010	3,710,000	21%	1,877,000	27%
2025	4,948,000	61%	2,400,000	62%
2040	6,296,000	105%	2,896,000	95%

Sources: U.S. Census 2000, Arizona Department of Economic Security, and MAG socioeconomic projections adopted 1997.

The high rate of increase in Maricopa County's foreign-born population, particularly from Latin America, is expected to continue in the future. Since recent immigrants have historically settled in central city locations and may initially have had higher than average poverty rates, the central cities may face growing pressure in terms of housing, social services, education and transportation for recent arrivals.

The number of both seniors and youths in Maricopa County is expected to rise substantially, fueling a need for facilities (e.g., health care and schools) to serve both groups, as well as increasing demands for transportation services. Persons aged 55 or older represent nearly one-third of new residents in the urban fringe areas of Maricopa County. This group will increasingly choose to remain in the workforce and continue to drive.

Regardless of age group, women today travel less than men. Younger women travel more than older women, however, and in the future, older women (today's young women) are expected to make as many vehicle trips as men of the same age.

2.3 The New Economy

In Maricopa County, New Economy activities are concentrated in a small number of industries that focus mainly on manufacturing, as opposed to services. Greater Phoenix has historically been dependent on real estate and tourism, and the majority of the jobs remain concentrated in a few vulnerable sectors of the economy.

Despite the large number of higher learning institutions in the greater Phoenix area, low educational attainment may hinder local growth of the New Economy. In 1999-2000, Arizona spent \$4,800 per K-12 pupil, 49th in the nation and far below the national average expenditure of \$6,600. The percentage of students graduating from high school was 77%, again 49th nationally and well below the national average of 86%.

Arizona has undertaken considerable efforts to understand and remedy its weaknesses with regard to the New Economy. The Greater Phoenix Economic Council (GPEC) is well positioned to assist economic development efforts in Maricopa County. The region's short-term economic outlook is excellent, in large part because of the abundance and variety of reasonably-priced housing. However, state and local leaders, like those in other regions, remain challenged by the following issues:

Improving the performance of the public schools

Nurturing and exploiting knowledge assets

Expanding access to technology

Providing an attractive quality of life for "knowledge workers"

2.4 Land Use and Urban Development

"Smart Growth" seeks to accommodate population increases in ways that preserve the integrity of the community, protect the environment and enhance economic vitality. Its goal is sensible growth that balances the need for jobs and economic development with the desire to save our natural environment and preserve quality of life. The recently enacted growth management legislation known as "Growing Smarter Plus" gives cities and counties expanded tools to manage growth.

Various forms of growth management are practiced in the MAG region. While no regional or state-level regime exerts strong management across the urban area, many local governments employ an array of growth management approaches. Large tracts of desert are being protected as open space around metro Phoenix communities, downtown cores are undergoing revitalization, infill development incentives are in place in many of the larger cities, and financial exactions are partially offsetting the costs to cities of new development.

In general, urban fringe communities tend to lag behind older cities in open space protection and the use of growth management tools. This has important implications for regional development, as 18 less populous cities on the urban fringe now control nearly as much land as the six largest cities combined.

Successful transportation planning requires coordination with land use planning. Transportation planning must be tied to regional growth and land use decisions, and must support economic development. Regional growth management is not capable of producing rapid change, however. If the most desirable land use and transportation plans were ready for implementation tomorrow, there would be no short-term changes in urban form, because currently entitled development will accommodate more than a decade's worth of growth.

The vast majority of land in Maricopa County is currently under private ownership. Public entities that own large land areas include the U.S. Bureau of Land Management, Bureau of Reclamation, U.S. Forest Service, and U.S. Air Force; the State of Arizona (chiefly state trust lands administered by the State Land Department); Maricopa County (primarily county parks); and cities (primarily parks and open space). Maricopa County also encompasses the Salt River Pima-Maricopa Indian Community, the Fort McDowell Mohave-Apache Indian Community, and a portion of the Gila River Indian Community.

As Figure 2-1 shows, in Maricopa County as a whole, vacant land accounts for 51% of the area, and residential and agricultural land for another 13%. The remaining 36% consists of open space (33%) and five smaller categories (3%).

Figure 2-1
Existing Land Distribution in Maricopa County by Use

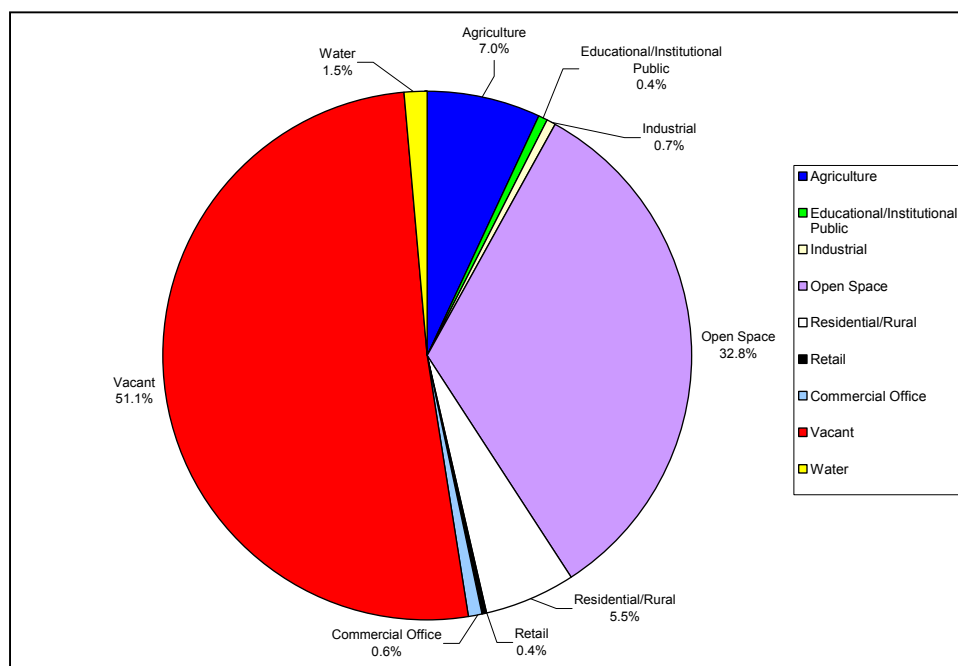
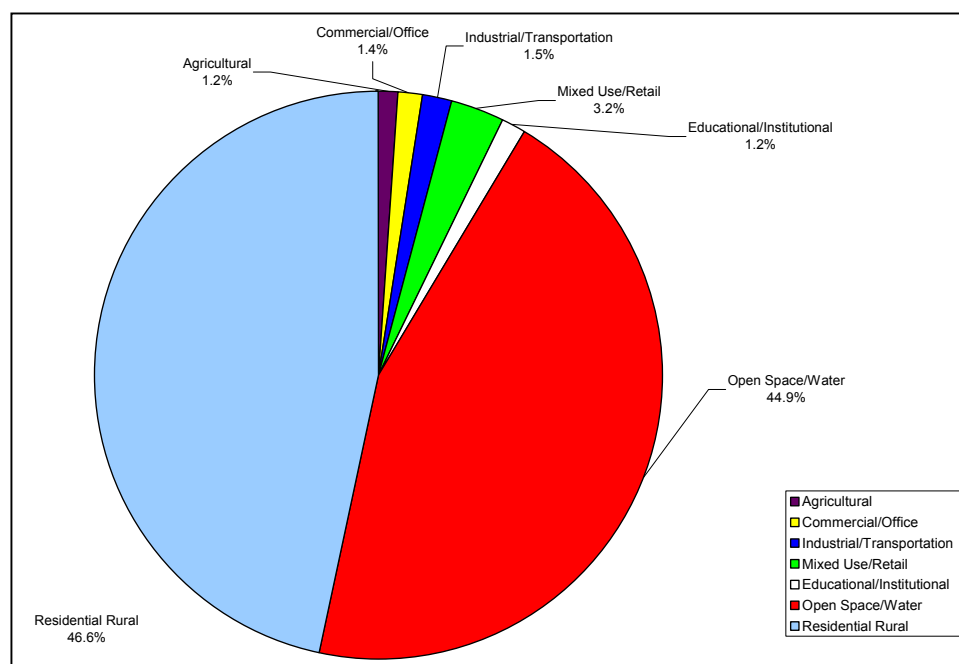


Figure 2-2 illustrates the envisioned ultimate distribution of land uses, based on the General Plans of MAG member jurisdictions. Some 45% of the land is projected to remain open space and 47% will ultimately be devoted to residential uses, including low-density rural development. The remaining 8% will be industrial, retail, mixed-use and agriculture. Agricultural uses are projected to decline from 7% today to 1% in the long run.

Figure 2-2
Land Distribution in Maricopa County by Use – Adopted General Plans



2.5 Environmental and Resource Issues

Air pollution is a public health concern in major cities across the United States. While per-vehicle emissions of pollutants have steadily declined owing to advances in technology and stricter regulations, vehicle miles of travel (VMT) continues to grow rapidly. Efforts to restrain VMT, along with continued progress in emission controls, will help to continue the improvement in air quality. Air pollution associated with motor vehicles is the most widely recognized and studied environmental impact of transportation. Portions of Maricopa County are currently designated as non-attainment under the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), ozone, and particulate matter under 10 microns in diameter (PM-10).

Potential water quality deterioration affects both surface water and groundwater. Impervious urban surfaces such as roads and parking lots increase both the volume and rate of surface runoff, and act as a conduit for a wide variety of toxic pollutants. In Maricopa County, overdraft of groundwater may cause deterioration in water quality, either through surface water contamination via earth fissures, or through pumping of water from deeper in the aquifers that are less pure. Water is ultimately a finite resource, although the current supply is ample. The “safe-yield goal” established by the Groundwater Management Act specifies that by 2025 no more groundwater can be taken out than is replaced. Water management and strategic planning will become increasingly important, since no large-scale public works projects (like the Central Arizona Project) to increase the future water supply are on the horizon. An increasing connection between water management and land use planning (and thereby transportation planning) is necessary.

The “heat island” effect of urban development has increased nighttime low temperatures in the urban area 8°F higher than 50 years ago. Because of this effect, the urban fringe now represents a boundary of well-defined discontinuity in microclimate.

2.6 Transportation Modes and Technologies

In recent years, automobiles and other light-duty vehicles have continued to dominate urban passenger travel, and driving alone has remained the predominant mode of travel to work. Suburb-to-suburb commuting has risen much faster than commuting from suburbs to the central core. During the last three decades, the most dramatic increase in VMT has occurred among personal vehicles (pick-up trucks, vans, sport utility vehicles) other than passenger cars.

Vehicle trips in the MAG area are projected to increase by 140% and VMT by 160% over the next 40 years. Substantial construction of new roads and improvements to existing facilities are planned to help meet the demand, but a large gap exists between available transportation funds and projected costs to build and maintain the transportation system. This shortfall will grow over time unless new revenue sources can be secured and existing sources indexed to inflation. Expiration of the countywide half-cent sales tax, currently scheduled for the end of calendar year 2005, would leave the Valley without dedicated regional revenue for construction of controlled-access highways, although strategies for replacement funding are currently under discussion. Only Glendale, Phoenix, Scottsdale and Tempe currently have a dedicated local tax for roadways and/or transit.

The cost of completing all transportation investments in the MAG Long Range Transportation Plan for 2000-2020 is estimated at \$23.5 billion, of which over \$9 billion will have to come from sources not currently on the books, such as an extension of the existing transportation sales tax and an increase in the state gasoline tax. Without added transportation revenue sources, the shortfall between financial needs and committed resources could be \$20 billion for the period 2000-2040.

As opportunities for new roadway construction in the region become more limited because of funding, right-of-way and environmental constraints, more emphasis will need to be placed on multimodal planning and design, transportation system management, grade separation of intersections, and Intelligent Transportation Systems (ITS). ITS shows promise as a way to manage and limit non-recurring delays due to incidents.

Locally, mass transit has progressed rapidly with voter approval of a special sales tax in Tempe, Phoenix and Glendale, and with design and impending construction of the Valley’s first light rail transit line. However, expansion of these improvements outside a few of the largest cities will probably not occur until a regional funding source for transit becomes available.

Advanced telecommunications and computerization are playing an increasing role in facilitating truck transport, especially in the rapidly growing markets for overnight and small-shipment delivery. The North American Free Trade Agreement will have substantial impacts on the transportation system in Arizona and other border states.

From 1987 to 1997, the national ranking of Phoenix Sky Harbor International Airport in annual commercial boardings rose from fourteenth to eighth; the total number of boardings increased by approximately two-thirds. Traffic at Sky Harbor will continue to grow rapidly in the next 40 years, with air cargo tonnage projected to grow by a factor of 18 while annual enplanements triple. (These projections were developed before the September 2001 terrorist attacks.) Although Sky Harbor has ambitious expansion plans, increased use of reliever airports in outlying areas may eventually prove necessary.

3.0 SUBREGIONAL FOCUS GROUPS AND STAKEHOLDER INTERVIEWS

In the spring of 2001, following the expert panel forums, MAG conducted 16 community focus groups throughout the region to identify transportation ideas and issues from a geographically and ethnically diverse cross-section of residents. Each group discussion covered the same five topics as the expert panel forums. The findings assisted the MAG project team in developing the values, goals and objectives presented in Chapter 7.0. Table 3.1 lists the focus groups, dates, locations covered by each, and number of participants.

Table 3.1: Subregional Focus Groups

Focus Group	Date	Locations Covered	Number of Participants
African-American	May 31	N/A	6
Agency Based	May 29	N/A	14
Ahwatukee/Guadalupe/Tempe	May 15	Ahwatukee, Guadalupe, Tempe	16
East Valley	May 7	Apache Junction, Mesa, Salt River Pima-Maricopa Indian Community	18
Gilbert	May 21	Gilbert	37
Hispanic-American	June 6	N/A	6
North Valley	May 8	Anthem, Black Canyon City, New River, North Phoenix	11
Northeast Valley	May 23	Carefree, Cave Creek, Fountain Hills, Fort McDowell Indian Community, Paradise Valley, Scottsdale	3
Northwest Valley	May 2	El Mirage, Sun Cities, Surprise, Wickenburg, Youngtown	16
Phoenix (Central)	May 17	Central areas of Phoenix	11
Phoenix (North)	May 22	North areas of Phoenix	7
Phoenix (West-South)	May 22	West and south areas of Phoenix	20
Southeast Valley	May 14	Chandler, Gila River Indian Community, Pinal County, Queen Creek, Sun Lakes	11
Southwest Valley	May 1	Avondale, Buckeye, Gila Bend, Goodyear, Litchfield Park, Tolleson	13
Transportation Review Committee	June 5	Members of MAG Transportation Review Committee	7
West Valley	May 21	Glendale, Peoria	10

The format of the focus groups included an opportunity for interactive discussion among participants, as well as a voting exercise that provided insights on priorities. Participants were encouraged to bring up their own issues and concerns relating to each topic, both individually and in a round-table discussion. The responses received were documented verbatim to ensure accurate communication of the message intended by each participant.

The MAG project team also conducted individual interviews with staff of 18 cities, towns and Indian communities in August and September 2001. In addition, MAG interviewed representatives of the Arizona State Land Department, U.S. Bureau of Land Management, Tonto National Forest and Arizona Municipal Water Users' Association. The purpose of the stakeholder interviews was to elicit local input for use in formulating alternative growth concepts for the region (see Chapter 8.0). These discussions focused on community development plans and policies, major activity centers, transportation corridors and other issues of interest to each jurisdiction. Detailed notes were taken for the project files.

4.0 EXISTING TRANSPORTATION SYSTEMS

In addition to the surface passenger transportation modes described below, the MAG region is served by two Class 1 freight railroads, one commercial air carrier airport, a number of general aviation airports, several intercity bus lines, and numerous trucking companies.

4.1 Regional Roadway System

The existing roadway system serving the MAG area consists of freeways, arterials, collectors and local streets. Table 4.1 summarizes existing capacity miles, lane miles and VMT by roadway type. Freeways comprise 9% of the system's lane miles and one-fifth of its capacity miles, but carry nearly one-third of the region's 17 million VMT during the weekday PM peak period. Arterial roadways carry the largest share (50%) of PM peak period VMT on 45% of the capacity miles. Collector and local streets account for 35% of capacity miles, but less than one-fifth of PM peak VMT.

Table 4.1: Existing Regional Roadway System Size and PM Peak Period Usage

Type of Roadway	Daily Capacity Miles	% of Capacity Miles	Lane Miles	% of All Roadway Lane Miles	PM Peak VMT	% of Peak VMT
Freeway	31,210,000	20%	1,486	9%	5,379,000	32%
Arterial	69,790,000	45%	8,724	52%	8,535,000	50%
Collector & Local	53,493,000	35%	6,687	40%	3,053,000	18%
TOTAL	154,493,000	100%	16,897	100%	16,967,000	100%

Source: MAG traffic model.

In 1985, voters approved Proposition 300, which authorized a one-half cent sales tax for 20 years to build a regional freeway system. The Proposition 300 system, as subsequently modified, is now scheduled for completion in 2007. The sales tax authorized by Proposition 300 will end on December 31, 2005. After that date, no regional funding source will exist to pay for system expansion, unless new legislation authorizes such a source.

Six general-use lanes is the standard freeway cross-section in the Phoenix metro area. Portions of I-10, US 60 and SR 202 have eight or even ten general-use lanes, however. Forty-three centerline miles of high-occupancy vehicle (HOV) lanes currently exist on freeways in the Phoenix metropolitan area. HOV facilities are open to all traffic during off-peak periods (times other than weekdays from 6:00 to 9:00 A.M. and 3:00 to 7:00 P.M.).

4.2 Regional Transit System

Fixed route bus service is currently the primary mode of public transportation in the MAG area. Valley Metro, the regional transit identity of RPTA, provides a coordinating function for the region's fixed route bus network. The regional fixed route bus system currently has 57 local routes and six circulator routes that operate throughout the day. Approximately 80% of transit riders on local routes are transit dependent.

Commuter express bus service, with a supporting system of 53 park-and-ride lots, currently exists primarily as an alternative mode for persons traveling to and from work. The region's 21 express routes

provide 137 bus trips to or from the Phoenix central business district every weekday. Over 90% of express bus riders have one or more vehicles in their household.

Ten local dial-a-ride services that cover approximately 950 square miles operate in the MAG region. Some of these systems serve only seniors and persons with disabilities, while others extend service to the general public. Wheelchair-accessible vehicles are available on request.

The Americans with Disabilities Act (ADA) requires that, whenever and wherever local buses operate, a parallel service be provided for persons with disabilities who are unable, because of their disability, to access or use local bus service. In the greater Phoenix area, complementary paratransit service must be provided in all areas within three-fourths mile of local bus service.

4.3 Non-Motorized Modes

The chief non-motorized modes in Maricopa County are bicycle and pedestrian transportation. MAG has published a 2001 Metropolitan Phoenix Area Bikeways Map that depicts striped on-street bike lanes, signed (but unstriped) on-street bike routes, paved and unpaved multi-use paths, special grade separations and other bicycle facilities. The MAG area has approximately 102 miles of on-street bike lanes, 91 miles of edge stripe bikeways, 386 miles of on-street bike routes, and 17 miles of paved shared-use paths. MAG does not produce a regional pedestrian facilities map, but has recently published a potential pedestrian activity map as part of the MAG Pedestrian Plan 2000.

5.0 PROGRAMMED AND PLANNED IMPROVEMENTS

This chapter addresses two types of future transportation improvements. Programmed improvements are short-term projects, generally scheduled within the next five years, for which a revenue source has been identified and funding committed. Planned improvements are longer-term projects that have been adopted by MAG or local jurisdictions as part of a transportation plan, but are not part of the Transportation Improvement Program (TIP) and do not necessarily have a committed source of funding.

5.1 Programmed Roadway Improvements

The adopted regional freeway system is on schedule for completion by 2007. The fiscal year (FY) 2003-2007 MAG TIP contains many ADOT projects dedicated to this end. The TIP also includes numerous HOV improvements, primarily park-and-ride lots and freeway HOV lanes and interchanges. Surface street improvement projects are distributed throughout the region. The majority of the street projects involve major widening. Some construction of new streets is also programmed.

5.2 Programmed Transit Improvements

The MAG 2003-2007 TIP contains approximately \$1.3 billion for transit capital projects, including rolling stock, maintenance facilities, and light rail components. The TIP also provides for construction of several park-and-ride lots throughout the Valley. The cities of Phoenix and Glendale, which recently approved dedicated sales taxes, have scheduled many capital and operating improvements to their bus and dial-a-ride systems during the next five years. The 20-mile initial operating segment of the Central Phoenix/East Valley (CP/EV) light rail line from Phoenix to Mesa is slated for completion in 2006, and commuter-oriented Bus Rapid Transit (BRT) service will begin in Phoenix in 2003.

5.3 Programmed Non-Motorized Improvements

The FY 2003-2007 MAG TIP contains 40 multi-use path projects and 47 other pedestrian/bicycle projects. In addition, many highway and roadway projects throughout Maricopa County incorporate bicycle and pedestrian facility improvements.

5.4 Planned Roadway and Transit Improvements

The MAG Long Range Transportation Plan (LRTP) 2002 Update calls for a considerable expansion of regional transportation facilities to accommodate forecast increases in population, person trips and VMT through the year 2022. Planned expansions to roadways and transit services include:

A 37% increase in freeway/expressway lane miles, including construction of new HOV lanes and development of access-controlled freeways or expressways in the Estrella, South Mountain and Grand Avenue corridors

A 40% increase in street lane miles

Tripling of local bus and paratransit (dial-a-ride) service

Quadrupling of express and commuter bus service

A 39-mile light rail system, including the 20-mile CP/EV line currently under final design

Completion of these improvements will require extension of the existing half-cent transportation sales tax and/or new funding sources such as an increase in the gasoline tax. It is assumed that construction of new arterials, but not widening of existing streets, will be funded primarily by private developers.

6.0 TRANSPORTATION SYSTEM CHARACTERISTICS AND PERFORMANCE, 2001-2040

Table 6.1 summarizes the following transportation system characteristics and performance measures for the years 2001, 2025 and 2040:

Socioeconomic Characteristics: Population, households, and employment.

Travel Demand Measures: Daily person trips, PM peak period VMT by functional class, and daily transit passenger miles.

Transportation Supply Measures: Roadway capacity miles by functional class, daily capacity miles of fixed-route transit service, and bikeway miles. The modeled transportation networks used in this analysis assume no capacity increases after the year 2025.

Performance Measures: Average PM peak period speed for the controlled-access and arterial roadway systems, congested PM peak period lane miles by facility type, and number of congested intersections. Transit performance is represented by passenger miles per capacity mile of service.

From 2001 to 2040, regional population and employment will approximately double, while the number of person trips is projected to grow by 105% and total VMT by 125%. Freeway VMT in the PM peak will grow at roughly the same rate as population and households, while growth in arterial VMT will exceed population growth. This occurs as the freeway system reaches capacity and travel is absorbed by the arterial system. Regional transit boardings are forecast to double by 2040, but the percent of person trips using transit and non-motorized modes is projected to remain at approximately 1%.

While total freeway and arterial VMT will grow considerably faster than population and employment, the differences between the growth rates in travel demand and in transportation facilities are projected to be even more dramatic. According to current regional plans and revenue projections, total freeway and arterial capacity miles will increase 41% by 2025, while PM peak VMT on these systems will increase 77%. If additional capacity is not provided after 2025, VMT will grow about three times faster than capacity miles from 2001 to 2040.

As a result of the growing gap between travel demand and the capacity of the system to meet this demand, each of the system performance measures will substantially worsen between now and 2040. Compared to 2001, the average PM peak period travel speed on freeway general purpose lanes will decline 28% and 67%, respectively, by 2025 and 2040. For freeway HOV lanes these figures are 49% and 77%; for arterials, they are 17% and 58%. Congested PM peak VMT will increase by 154% and 282% on freeways, and 185% and 562% on arterials. The number of congested intersections will rise 154% by 2025 and 327% by 2040. As noted previously, these figures assume no freeway or arterial capacity increases beyond 2025.

Table 6.2 shows how travel mode split and average trip length are forecast to change between 2001 and 2040. As the region expands, the average trip length will increase from 7.4 to 8.7 miles, fueling an increase in regional VMT (Table 6.1). Based on current forecasts, changes in mode split will be minimal, however.

Table 6.1: Key Projected Trends, 2001-2040

Socioeconomic Characteristics	Year			Percent Growth	
	2001	2025	2040	2001-2025	2001-2040
Population	3,072,000*	4,948,000	6,296,000	61%	105%
Employment	1,483,000*	2,400,000	2,896,000	62%	95%
Demand Measures					
Daily Person Trips**	12,962,000	21,161,000	26,518,000	63%	105%
--% single-occupant vehicle	58%	57%	56%	-1%	-3%
--% carpool/HOV	41%	42%	43%	2%	5%
--% transit + non-motorized	1%	1%	1%	0%	0%
PM Peak VMT—Freeway	5,379,000	9,319,000	10,742,000	73%	100%
PM Peak VMT—Arterial	8,535,000	15,246,000	20,628,000	79%	142%
Daily Transit Passenger Miles	568,000	1,725,000	1,436,000	204%	153%
Supply Measures					
Lane Miles—Freeway	1,486	2,066	2,066	39%	39%
Lane Miles—Arterial	8,724	12,332	12,332	41%	41%
Daily Transit Capacity Miles	5,154,000	10,082,000	10,082,000	96%	96%
Bikeway Miles	1,963	3,353	3,353	71%	71%
Average PM Peak Period Speed—Freeway (GPL ***)	36 mph	26 mph	12 mph	-28%	-67%
Average PM Peak Speed—Freeway (HOV)	57 mph	29 mph	13 mph	-49%	-77%
Average PM Peak Speed—Arterial	24 mph	20 mph	10 mph	-17%	-58%
Congested^ Lane Miles—Freeway (PM Peak)/as % of total	437/29%	1,053/51%	1,411/68%	141%	223%
Congested Lane Miles—Arterial (PM Peak)/as % of total	844/10%	2,504/20%	5,227/42%	197%	519%
Congested^ Intersections (PM Peak)	326	829	1,393	154%	327%
Transit Passenger Miles/ Capacity Mile	0.11	0.17	0.14	55%	27%

*Year 2000 population and households based on U.S. Census counts. Other socioeconomic data based on adopted MAG projections.

**Totals do not include Sky Harbor, truck, external-internal or external-external trips.

***GPL = general purpose lanes.

^Congestion is defined as level of service E or F.

Note: Forecasts based on current version of MAG model that assumes no new freeways, arterials or transit service after 2025.

Sources: MAG and RPTA, August 2001.

Table 6.2: Travel Characteristics of Phoenix Metropolitan Area, 2001-2040

Characteristic	2001	2025	2040
Daily Mode Split (%)			
Single Occupant	46%	46%	45%
Carpool/HOV	33%	34%	35%
Transit + Non-Motorized*	1%	1%	1%
Other^	20%	19%	19%
Average Trip Length (miles)			
Work	12.5	14.1	14.2
Non-Work	5.7	6.2	6.5
Total	7.4	8.4	8.7

*Work trips only.

^Includes Sky Harbor, truck, external-internal and external-external trips.

Source: MAG, August 2001.

7.0 VALUES, GOALS AND OBJECTIVES

The process for developing values, goals, objectives and strategies involved seeking ideas and input from a variety of sources. These sources included the results of the five expert panel forums held in February and March 2001 and the 16 focus group sessions held in May and June 2001. Comments and information from these sessions were consolidated and documented to provide a record of the concerns and ideas expressed by the attendees. In addition, information was obtained from a document search, which focused on goals and objectives in member agency general plans and other planning documents. This information was augmented by the results of other RTP study tasks, input from staff, and comments from the MAG Transportation Review Committee and MAG modal committees.

The goals and objectives will provide the basis for developing performance measures used for plan evaluations. As a result of this process, the goals and objectives themselves may be expanded and refined, as the RTP process proceeds. Therefore, the goals and objectives presented here are draft in nature.

7.1 Values

Values are an organized and persistent set of preferences, which, consciously or not, influence the choices we make. Values are fundamental beliefs regarding what is important and what is not, or what is desirable and what is not. Establishing a set of values allows planners and elected and appointed decision-makers to consider what people value and what their priorities are. Values are used not only to shape plans, but also to motivate long-term commitment to those plans and their implementation. They are tools for inspiring achievement and unifying energies toward a future that is considerably more desirable than it would be without such thoughtful preparation. The values set the stage for development of goals, objectives and strategies.

A set of regional values derived from input provided by the forums, focus groups and other research is provided below. These values correspond to ideas expressed in the context of regional development and transportation in the MAG area. The values reflect common ground for developing transportation goals, objectives and strategies.

The opportunity for everyone to improve their lives
We believe that all individuals in our growing and diverse population should have access to educational, employment, shopping, medical/health, recreational and cultural activities.
A strong, growing economy
We want a strong and growing economy that provides quality jobs, opportunities for personal growth and the ability to increase our standard of living.
The natural environment
We care about protecting nature, maintaining a healthy environment, and preserving the open spaces and natural beauty of the region for future generations.

Quality life-style options
We want the region to develop in a way that offers a variety of safe, healthy and pleasant neighborhood and working environments, recreational and cultural amenities, as well as options for how we travel.
Effective and efficient use of public resources
We want existing assets to be managed effectively and new investments made wisely, providing efficient services to the public.

7.2 Goals

A goal is a general statement of purpose that represents a long-term desired state of affairs. It is generally measurable by qualitative means. The ideas expressed in the goals represent themes repeated often by participants at the forums and focus groups. By identifying broad goals that are both visionary and practical, and that respond to the values of the region, the focus of the planning process can be more readily communicated to the public. Each goal, in turn, can be defined in greater detail by specifying multiple objectives. The goals aim to answer the question: How can transportation help support our values?

The following four major transportation goals for the region have been identified:

GOAL # 1: MAINTENANCE & SAFETY – Transportation infrastructure that is well maintained and safe.
GOAL # 2: ACCESS & MOBILITY – Affordable transportation services that provide accessibility and mobility for everyone.
GOAL # 3: SUSTAINING THE ENVIRONMENT – Transportation improvements that help sustain our environment and quality of life.
GOAL #4: ACCOUNTABILITY AND PLANNING – Transportation decisions that result in effective and efficient use of public resources and strong public support.

7.3 Objectives and Strategies

An objective is very similar to a goal, as it represents a desired end state of affairs. However, an objective is an intermediate result that must be realized to reach a goal. The definition of an objective is usually more focused than that of a goal and is typically more subject to being measured. The objectives were drawn from input received through the focus group process, document research and MAG committee review comments. These ideas were grouped to help answer the question: How can we achieve our transportation goals?

Following the identification of objectives, a set of strategies was prepared for each objective. A strategy is a particular method or procedure to be followed to achieve an objective. Strategies are more specific in approach than objectives and address more limited areas of concern. As used here, strategies are intended to address questions concerning: What steps should we be taking to achieve our transportation objectives?

Finally, regional transportation goals, objectives and strategies were organized into the listing shown below. This table will provide the basis for identifying system performance measures and evaluation criteria to help guide transportation investment decisions.

GOAL # 1: MAINTENANCE & SAFETY – Transportation infrastructure that is well maintained and safe.

OBJECTIVE 1A: Provide for the continuing maintenance needs of transportation facilities and services in the region, eliminating maintenance backlogs.

Strategies:

Prioritize maintenance and operations needs, including litter control and landscape maintenance, as a specific component of the regional transportation planning and decision-making process.

Identify the continuing maintenance and operations needs, including backlogs, for transportation facilities and transit services as part of the regional planning process and incorporate into long range plans.

Utilize appropriate maintenance and operations management systems to identify optimal approaches to preserving the region's transportation infrastructure.

Ensure that the level of maintenance provided on State facilities in the region does not decline due to diversion of funding to other areas.

OBJECTIVE 1B: Provide a safe and secure environment for the traveling public, addressing roadway hazards and incident response, pedestrian and bicycle safety and transit security.

Strategies:

Reduce incident response and removal times to reduce ancillary crashes and traffic congestion.

Incorporate safety considerations into the regional transportation and mobility planning and programming process for all modes of transportation and incorporate into long range plans.

Assess and sponsor new and innovative transportation and mobility safety measures and projects.

Identify high crash rate locations on the street and highway system and develop potential methods to reduce the crash rate.

Ensure actions to facilitate airport security at both commercial service and general aviation airports.

Conduct health impact assessments of transportation plans and programs.

GOAL # 2: ACCESS & MOBILITY – Affordable transportation services that provide accessibility and modal options for everyone.

OBJECTIVE 2A: Maintain an acceptable and reliable level of service on transportation and mobility systems serving the region, taking into account performance by mode and facility type.

Strategies:

Identify and support transportation system management (TSM) strategies that enhance traffic flow and reduce intersection delay.

Provide the infrastructure to support traveler information systems that can provide real-time crash, delay and alternative routing information so that travelers can make better decisions to avoid congestion or incidents.

Identify and implement Intelligent Transportation System (ITS) in regional corridors to improve traffic flow and reduce congestion.

Assess airport facility needs, taking into account airspace, land use compatibility, cost, ground access, and user convenience to develop a regional airport system plan and implementation program.

Consider pedestrian and non-motorized vehicle usage efficiencies in the design of measures to improve traffic flow.

OBJECTIVE 2B: Provide residents of the region with access to jobs, shopping, educational, cultural and recreational opportunities and provide employers with reasonable access to the workforce in the region.

Strategies:

Improve and expand the street system throughout the region to respond to growth in travel demand, through coordinated functional classification, design standards and project prioritization.

Improve and expand the public transit system throughout the region to respond to growth in travel demand and provide a range of transportation options.

Assess the need for new major regional highway and transit corridors, as well as capacity enhancements for existing regional facilities, and prepare implementation plans for right-of-way protection and facility development.

Maintain a dialogue with the business community and economic development agencies, regarding employee transportation requirements and goods movement needs.

Work closely with local planning and economic development agencies to balance planned and existing transportation infrastructure with future growth and economic development.

Provide a range of housing in terms of types and affordability within commute-sheds of job centers to minimize cross-regional travel.

OBJECTIVE 2C: Maintain a reasonable and reliable travel time for moving freight into, through and within the region, as well as provide high-quality access between intercity freight transportation corridors and freight terminal locations, including intermodal facilities for air, rail and truck cargo.

Strategies:

Assess the specific needs of goods movement and identify infrastructure improvements to provide for efficient movement of freight to, from and within the region.

Develop airport infrastructure and ground access to airports, increasing capacity of air cargo facilities.

Enhance partnerships between the private freight industry and public agencies to improve and maintain the region's integrated multi-modal freight network.

Provide alternative routing around the metropolitan area for trucks that are moving through the area and do not have to stop.

Support the development of effective and efficient intermodal freight centers at appropriate locations in the region.

Help facilitate efficient movement of rail freight to, from and within the region.

OBJECTIVE 2D: Provide the people of the region with transportation modal options necessary to carry out their essential daily activities and support equitable access to the region's opportunities.

Strategies:

Provide affordable, quality transit service that connects regional centers and provides access to neighborhoods and employment areas by expanding the bus and light rail systems to cover more area and provide 24-hour services along key routes.

Establish a system of park-and-ride facilities that are integrated with express transit services, the regional light rail system and HOV lanes.

Continue to plan for the expansion of the regional light rail system, including the supporting bus and park-and-ride lot facilities.

Identify and support a regional system of pedestrian and bicycle facilities that provide access to local amenities, regional activity centers and major recreational areas, taking into account the importance of connectivity and safety.

Implement High Occupancy Vehicle (HOV) lanes on all regional freeway facilities to provide enhanced mobility for car pools, buses, and emergency vehicle response.

Develop a demonstration project that tests the applicability of Express lanes that would allow single occupancy vehicles to use excess available capacity on the HOV system for a cost per mile of travel.

OBJECTIVE 2E: Address the mobility needs of the elderly and Title VI and Environmental Justice populations and avoid or mitigate adverse or disproportionately high impacts of transportation projects on these groups.

Strategies:

Assess demographic trends and associated transportation and mobility implications, with particular attention on elderly mobility issues and the growing diversity in the population.

Maintain a dialogue with transportation users, and potential users, to help identify system deficiencies and special user group needs, such as demand responsive service to target population groups and needs of pedestrians. .

Monitor technical advances in alternative modes and their potential application to specific needs of population groups.

Apply universal access design principles in the development and improvement of transportation facilities and services.

Identify the geographic distribution of Title VI / Environmental Justice population groups and assess the potential impact of proposed policies and projects.

Conduct public involvement / outreach programs to solicit input from Title VI / Environmental Justice populations during the regional and corridor planning studies.

Encourage the development of affordable housing in proximity to job centers to improve the job accessibility for Title VI population groups.

GOAL # 3: SUSTAINING THE ENVIRONMENT – Transportation improvements that help sustain our environment and quality of life.

OBJECTIVE 3A: Identify and encourage implementation of mitigation measures that will reduce noise, visual and traffic impacts of transportation projects on neighborhoods.

Strategies:

Develop a list of “best practices” for impact mitigation for regional transportation projects including land use planning, noise mitigation measures, visual enhancement techniques and other methods to reduce neighborhood impacts.

Strengthen land use planning around airports to avoid residential encroachment and to encourage compatible non-residential land uses.

Identify future regional transportation corridors early and to ensure that these corridors are appropriately reflected on the land use plans of local jurisdictions and pursue measures to protect the corridors from encroachment and neighborhoods from impacts of future facilities.

OBJECTIVE 3B: Encourage programs, projects and land use planning that reduce the dependence on single occupant vehicles, reduce the number of trips per household, and reduce trip lengths.

Strategies:

Identify and support transportation demand management (TDM) strategies that reduce dependence on single occupant vehicles and reduce travel through means such as telework, compressed work weeks, and other flex-time concepts.

Apply transportation solutions utilizing options that reduce vehicle miles of travel, automobile trips and reduce vehicular emissions.

Coordinate with local agencies during development of general plans to achieve an appropriate balance between jobs, housing and transportation facilities and support the development of neighborhoods where work, home, school and amenities are in close proximity.

Concentrate growth near activity centers that provide a mixture of residential, commercial, entertainment, recreation, civic and cultural uses, thus resulting in multi-purpose trips, shorter trips, and trips that can utilize alternative modes, including walking.

Encourage new developments that are located and designed to enhance the pedestrian accessibility of the surrounding area and encourage alternative modes of transportation.

Consider new legislation, regional impact fees or other mechanisms that address regional land use and transportation issues such as infrastructure capacity, mitigation and design standards.

Identify and support incentives for infill development and encourage redevelopment and revitalization in higher density urban cores.

Encourage the development of telecommunications infrastructure to reduce the number of trips taken, particularly single occupant vehicle trips.

OBJECTIVE 3C: Make transportation decisions that are compatible with air-quality conformity and water-quality objectives, the sustainable preservation of key regional ecosystems and a high quality of life.

Strategies:

Test transportation projects, plans and programs for conformity with air quality standards.

Conduct appropriate environmental assessments of proposed transportation projects to identify potential impacts and mitigation strategies.

Avoid inappropriate transportation facility development in areas that contain sensitive natural resources, environmental hazards, water features, watercourses, and scenic/recreational sites.

Pursue transportation solutions using alternative energy sources that reduce the need for oil, reduce air pollution and increase cost efficiency.

Coordinate the maintenance, enhancement and development of existing and new scenic corridors with state and local agencies, and the development community.

Facilitate transportation access to regional parks, open space, and recreation destinations.

GOAL #4: ACCOUNTABILITY AND PLANNING – Transportation decisions that result in effective and efficient use of public resources and strong public support.

OBJECTIVE 4A: Make transportation investment decisions that use public resources effectively and efficiently, using performance-based planning.

Strategies:

Develop regional policies, strategies and performance measures for identifying transportation needs, prioritizing improvements, implementing projects and monitoring and evaluating investments.

Produce an annual report that describes the status of the implementation of Regional Transportation Plan including material changes in scope, budget or schedule of major transportation projects.

Periodically assess the performance of the regional transportation system using the objectives and performance measures identified in the Regional Transportation Plan and make any changes to the plan to better meet the plan objectives.

Periodically assess the regional growth outlook and other assumptions, including technology, underlying the plan and make changes to the Regional Transportation Plan to reflect the latest information.

Evaluate promising transportation and information technologies that serve to interconnect systems, improve safety, reduce the need for travel and facilitate traffic flow.

OBJECTIVE 4B: Establish a dedicated revenue source that provides consistent funding for regional transportation and mobility needs.

Strategies:

Coordinate with federal, state, and local agencies to identify funding mechanisms to improve, construct, operate and maintain all modes of transportation.

Support and seek voter approval for regional dedicated revenue for new and existing regional transportation corridors and improvements to street networks, public transit services and pedestrian facilities.

Encourage the use of developer-funded strategies to finance growth-related transportation capacity needs.

OBJECTIVE 4C: Achieve broad public support for needed investments in transportation infrastructure and resources for continuing operations of transportation and mobility services.

Strategies:

Communicate with the public to educate people on the transportation planning process and the rationale for regional transportation decisions.

Foster a variety of citizen involvement activities with the public to solicit broad participation, input and debate on proposed transportation plans and implementation proposals.

Communicate directly with local communities, affected neighborhoods and employers to help ensure that decisions are responsive to local community needs.

8.0 ALTERNATIVE GROWTH CONCEPTS

The MAG project team developed four hypothetical growth scenarios regarding the future spatial distribution of population and employment in Maricopa County (along with a portion of northern Pinal County). These scenarios were designed to be different enough from each other to produce distinctive results, and to have a balance of realism and vision. In developing the growth scenarios, consideration was given to the following issues:

Population and employment control totals (a population of approximately 9 million was assumed)

Interview findings

Jurisdictional boundaries

Community visions and general plans

Large land holdings (public and private)

Existing/planned/potential land uses

Existing/planned/potential transportation systems (including fixed guideway regional investments)

Past and future planning and development trends

Past and future revitalization and redevelopment opportunities

Quality of life issues

Open space/natural environment preservation

Results of recent public opinion polls and surveys on urban growth, revitalization and preservation

Input from MAG RTP Focus Groups and expert panel forums conducted in the first half of 2001

The growth scenarios prepared in Phase I of the RTP were developed within the context of adopted local land use plans. The land use patterns and density ranges of local plans were utilized to structure four possible regional growth patterns that might evolve from these local plans. The purpose of the analysis was to gain insights into the possible nature of future travel demand in the region and how that might affect the need for transportation facilities within the context of local land use plans. The goal was not to identify a transportation system that would drive land use patterns. The local land use planning function drives future regional growth patterns. The RTP transportation system and priorities will be based on MAG adopted regional population and employment projections, which are based on local land use plans.

8.1 Definition

The four alternative growth concepts (or scenarios) are defined as follows:

Scenario 1, Base Case/General Plan Framework: This scenario focuses on continued development and planning consistent with new, or soon to be adopted, general plan updates of local MAG member jurisdictions.

Scenario 2, Infill/Urban Revitalization Emphasis: In this scenario, the general plans and development standards of MAG members would require significant revision. Such revisions would focus on increased densities when redevelopment occurs, especially along fixed-guideway transit corridors; infill development on vacant or redevelopment lands to maximize use of existing infrastructure; and revitalization of existing neighborhoods and the stimulation of mixed use development in high density

areas, as a part of any new infill or redevelopment project, or as part of urban activity center development. A more compact urban form would result, with 65 to 75 percent of future growth in the next 50 years occurring in existing urbanized areas, and the remainder occurring on the urban fringe.

Scenario 3, Activity Center Emphasis: As in Scenario 2, the general plans and development standards would require revision under this scenario. Such revisions would be similar to Scenario 2; however, the plans would be revised to concentrate future growth and development not only in existing urbanized areas, but also in regionally identified activity centers and along major transportation corridors throughout the metropolitan area.

Scenario 4, Suburban Fringe Growth Emphasis: This scenario would further extend growth and development patterns in the metropolitan areas outward with no encouragement for either infill development or urban revitalization, no encouragement for nodal activity center development, and an emphasis on attempting to achieve a job/housing balance only on a subregional basis. This scenario is the most lax in terms of planning and development standards.

Scenario 1, Base Case/General Plan Framework, is essentially a continuation of historical and current development trends using the preliminary updated general plans of most MAG members. The remaining three scenarios build upon the first scenario, with each emphasizing an alternative development pattern that would be a change from historical and current trends.

8.2 Implementation Issues

Table 8.1 lists major issues and requirements associated with each of the four alternative scenarios. Overall, the Base Case and Suburban scenarios would be the easiest to implement because they are the most consistent with existing and planned land use, current environmental priorities, and transportation planning programs and processes now in place. The Suburban scenario, while in many ways similar to the Base Case, could significantly increase the costs of providing urban services to the fringe areas.

The institutional issues associated with Infill and Activity Centers would present the greatest challenge, but also the most active approach to growth management. The Infill scenario is probably the most difficult to implement. Due to the large amount of vacant, developable land on the periphery of the urban area, stringent growth controls that would limit expansion of the urbanized area and significant financial incentives to encourage infill development would be required. Such measures could change the economic competitiveness of the region's remaining activity centers.

The Activity Center scenario would be the next most challenging to implement. General Plans and other current processes associated with the provision of urban services would need to be revised to achieve activity-center-oriented development and linear development along major transportation corridors.

Table 8.1: Implementation Issues by Growth Scenario

Implementation Issue	Regional Growth Concept/Scenario		
	Base Case/General Plan	Infill	Activity Center
Land Use	Maintains current growth trends consistent with new General Plans. Balances new growth with expanded infill and current redevelopment. Emphasizes maximum use and buildout of existing commercial and employment areas before building new ones. Geographical expansion will require ongoing municipal annexation and trunk infrastructure extensions.	Refocuses growth to emphasize infill in areas already served by a high level of urban public infrastructure. Emphasizes enhanced commitment to urban revitalization in existing core communities. Uses new redevelopment areas to convert underutilized properties to productive use. Uses higher land densities in urban redevelopment, including transit-oriented development. Uses comprehensive growth management policies to restrict peripheral growth.	Refocuses growth into a series of regional activity centers on major transportation corridors. Emphasizes higher-density, mixed-use development at the core of each activity center. Assumes balance of infill and urban revitalization, with new development focused around activity centers. Includes opportunity to develop subregional facility service centers to reduce need for long trips to central business district.
			Suburban
			Maintains and enhances current growth and development trend in Maricopa County. Places less emphasis than current trend on infill and urban revitalization, which could result in "leapfrogging" and areas of urban disinvestment. Reflects an overall lower-density development pattern. Potentially attempts to balance jobs/housing subregionally to contribute to trip reduction and limit long-distance commutes.
Environmental	Maintains current commitments to archaeological and historic preservation. Balance of greenfield (raw land) to brownfield (formerly utilized site) development tilts toward new suburban greenfield sites. Current desert/habitat preservation efforts continue, but no major new initiatives.	Entails maximum effort to promote desert and natural habitat preservation; could also include permanent agricultural preserves. Incorporates preservation of archaeological and historical sites as key elements of cultural heritage in any revitalization/redevelopment efforts. Emphasizes conversion of brownfield and other underutilized sites for mixed-use urban development prior to urban fringe growth. Places only 25-35% of 50-year projected growth on suburban fringe.	Focuses potential desert preservation, natural habitat preserves in areas between activity centers. Similar to Infill in focus on archaeological and historical preservation. Addresses issues such as air quality and noise through development of multimodal transportation systems geared to the unique characteristics of each activity, and through the creation of high-capacity transportation linkages. Encourages a regional open space and trail system linking the activity centers.
			Includes less emphasis than other scenarios on desert preservation. Emphasizes greenfield development and rural land utilization over infill development, urban revitalization and managed fringe growth.

Table 8.1 (continued)

Implementation Issue	Regional Growth Concept/Scenario		
	Base Case/General Plan	Infill	Activity Center
Transportation	<p>Balances the need to maintain/enhance existing regional roadways with the need to build new ones.</p> <p>Balances the need to maintain/enhance high-capacity public transportation with the need to build new system components.</p> <p>Increases regional commitment to expand Intelligent Transportation Systems and Transportation Management Associations.</p> <p>Assumes completion of CP/EV LRT line, with extensions phased over the long term.</p>	<p>Requires large-scale investments in alternative modes to the single-occupant vehicle, to provide urban mobility under conditions of higher-density development.</p> <p>Assumes multiple extensions of the CP/EV corridor throughout the region.</p> <p>Assumes complementary development of BRT in HOV corridors on the loop freeway system, as well as in a radial pattern to the urban core.</p> <p>Includes much stronger emphasis on bicycles, pedestrian circulation, shuttle circulators, neighborhood electric vehicles, etc.</p> <p>Also includes strategies to encourage mixed-use activity centers and core development, such as lower parking requirements and less free parking.</p>	<p>Balances the need to maintain/expand regional roadways with the need to expand them.</p> <p>Requires significant expansion of multimodal public transit systems to provide high commute capacity, link peripheral activity centers, and provide connections with the urban core.</p> <p>Allows the development of multimodal transportation systems (see alternative modes under Infill) to serve trips within activity centers and to surrounding areas and master-planned communities.</p> <p>Like Infill, includes complementary strategies to encourage mixed-use activity centers and core development.</p>
			Suburban
			<p>Places highest emphasis on expansion of the current regional street and highway system to serve new growth and development on the fringe.</p> <p>Emphasizes flexible public transit system focused on express bus/HOV and BRT technologies on an expanded freeway system.</p> <p>Requires major commitment to provide continuing maintenance on an expanded transportation system to serve low-density development pattern.</p> <p>Increases regional commitment to expand ITS and TMA systems to maximize existing system capacities.</p>
Economic	<p>Must address fiscal impacts of continued suburban fringe development on public facilities and services.</p> <p>Continues regional commitment to affordable housing development.</p> <p>Emphasizes need to secure resources for transportation system enhancement and expansion.</p> <p>Does not address current competition between municipalities for economic development to maximize sales tax revenue.</p>	<p>Incorporates incentives to attract and retain businesses in the urban core, along major transportation corridors and within existing activity centers.</p> <p>Incorporates incentives to accommodate affordable housing throughout the region, particularly near employment centers and high-capacity transit.</p> <p>Requires ongoing commitment to fund the maintenance, enhancement and new development of educational facilities in the existing urban area.</p> <p>Requires ongoing commitment to fund maintenance, enhancement and new development of public facilities and services in the existing urban area.</p>	<p>Like Base Case, must address fiscal impacts of continued suburban fringe development on public facilities and services.</p> <p>Like Base Case, emphasizes need to identify and secure right-of-way for transportation system expansion.</p> <p>Like Base Case, emphasizes need to identify and secure resources for transportation (roadway and transit) enhancement and expansion.</p> <p>Does not address current competition between municipalities for economic development to maximize sales tax revenue.</p>

Table 8.1 (continued)

Implementation Issue	Regional Growth Concept/Scenario		
	Base Case/General Plan	Infill	Activity Center
Political	<p>No significant development controls beyond current activities, with emphasis on regional planning coordination.</p> <p>Does not commit to establishing a single Regional Vision and preferred urban form scenario, but relies on recently adopted General Plan updates from each jurisdiction to guide local growth.</p> <p>Suggests slightly more emphasis on infill development, redevelopment and transit-oriented design/development to capitalize on upcoming CP/EV investment.</p> <p>Addresses regional planning to level required by Growing Smarter Plus.</p>	<p>Assumes regional consensus could be reached on emphasizing compact growth and urban revitalization, limited suburban growth and maximizing desert/open space preservation. This would probably include urban growth boundaries.</p> <p>Requires significant revision to general plans, zoning ordinances and development regulations to focus on infill, urban revitalization, higher densities, mixed-use activity centers and limited suburban growth.</p> <p>Emphasizes expenditures on non-auto transportation modes, travel reduction and transportation management strategies.</p> <p>Requires incentives to encourage urban redevelopment, transit-oriented development/design, and mixed-use development in activity centers.</p>	<p>Assumes regional consensus could be reached on a polycentric (activity center based) approach to regional growth and development.</p> <p>Like Infill, requires extensive revision to general plans, zoning ordinances and development regulations.</p> <p>Like Infill, requires development of a substantial multimodal transit system within and between activity centers.</p> <p>Requires incentives to encourage mixed-use activity center development, transit-oriented design, and transit-oriented development projects.</p>
			<p>Suburban</p> <p>Like Base Case, requires no major commitment beyond current planning and development activities.</p> <p>Like Base Case, does not commit to establishing a Regional Vision and preferred urban form scenario, but relies on recently adopted General Plan updates to guide local growth.</p> <p>Addresses regional planning only to the degree required by Growing Smarter Plus.</p> <p>Requires strong incentives for implementation of trip reduction strategies, due to long commute distances imposed by dispersed urban development pattern.</p>

Table 8.2 summarizes the relative complexity of implementing each regional growth scenario.

Table 8.2: Implementation Complexity of Alternative Growth Concepts

Growth Concepts	Degree of Change from Status Quo	Implementation Complexity
Base Case/General Plan	Modest	Moderate
Infill/Urban Revitalization	Radical	Highest
Activity Center	Substantial	High
Suburban/Fringe Growth	Minimal	Lowest

8.3 Comparative Analysis

8.3.1 Overview

MAG compared the forecast transportation conditions generated by each of the four alternative growth concepts for approximately the year 2050, when the population of the MAG region (including part of northern Pinal County as well as Maricopa County) could reach 9 million. The hypothetical 2050 regional roadway and transit system used with all four growth scenarios consist of existing facilities and services, plus three levels of improvement: *programmed improvements*, *planned improvements*, and *further capacity additions for modeling purposes*. Programmed and planned improvements were summarized in Chapter 5.0. “Further capacity additions for modeling purposes” expand the roadway network required to service a metropolitan region of approximately 9 million people, covering a geographical area much larger than in 2025.

Although the details of long-term regional growth patterns differ by scenario, a single freeway and arterial network was tested to facilitate comparative impact analysis. The facilities coded into the MAG 2050 modeled network include not only large-scale expansion of the roadway system into outlying areas, but also increasing capacities on freeways and other roads to accommodate anticipated travel demand from the population of 9 million. These coded improvements do not represent a plan and have been assumed for analytical purposes only, without any attempt to judge the feasibility of any specific element.

One reason for inclusion of the capacity and coverage expansions was MAG’s previous experience in testing a smaller, 2040 network designed to serve a population of 6.3 million. That network encountered high congestion levels that interfered with the modeling function, so capacity increases were included to avoid modeling breakdown due to a further population increase of nearly 50%.

In addition, transit coverage and service levels were expanded and enhanced throughout the region. These additional modeled improvements include an increase in service between 2025 and 2050 similar to the planned increase between 2000 and 2025, with a significant geographical expansion of the transit service area. Expansion of this area during the 2025 to 2050 period would include locations in newly urbanizing areas of Maricopa County and contiguous areas of Pinal County.

This analysis provided an indication of the interaction of each of the four growth concepts with the transportation system. Customization of the transportation system for each growth concept undoubtedly would improve the performance and efficiency of the transportation system associated with each scenario, and would also improve the comparisons of the four scenarios. Such analysis was beyond the scope of this project, however. It is important to recognize that the potential for variation of the transportation system, especially the roadway network, is somewhat limited because of the vast system that already

exists and the limitations to new transportation corridors due to existing developments. As a result, large variations in the transportation system by growth concept are not likely. On this basis, the conclusions presented herein are believed to offer insight into each growth concept from a transportation perspective.

8.3.2 Performance Summary

Table 8.3 defines performance measures designed to gauge how well each scenario meets the MAG transportation goals and objectives listed in Chapter 7.0. From one to three performance measures are associated with each objective listed under Goals 1 through 3, except for Objective 3A which cannot be evaluated quantitatively. Some measures have been used more than once—e.g., daily transit passenger miles and daily boardings per 1,000 residents for Objectives 2D and 2E.

8.3.3 Transportation Insights

Base Case Concept

The Base Case concept represents the combination of existing general plans of all the local jurisdictions in the metropolitan area. These plans reflect existing development trends, visions and desires of the individual communities. When the Base Case is tested against the planned transportation system plus a continuation of that system beyond the current planning horizon, the analyses indicate that this concept had the most congestion of the four scenarios tested. Although general plans are developed in concert with transportation plans, these plans often must attempt to reconcile conflicting views of how best to accommodate future growth. Also, the general plan of any one community is not necessarily consistent with those of adjacent jurisdictions. These factors may have contributed to the higher levels of congestion.

Infill Concept

The Infill growth concept is characterized by full use and revitalization of the existing developed areas and a greater concentration of employment in established employment centers, especially central business districts. This concept would result in the least outward spread of the urban area.

The Infill scenario would result in the most transit usage and the second lowest congestion on the highway system. However, it would require substantial upgrading of the existing freeway system beyond any current plans or expectations. Such extensive upgrading would be very expensive, especially in the built-up areas within the Inner Loop (SR 101). As noted in Section 8.3.1, this growth concept generally results in the highest traffic volumes on freeways in the central part of the metropolitan area.

Due to the greater densities and concentration of employment, transit would be more effective than with other growth concepts, and there would be greater opportunities to use the full range of transit and non-motorized modes. Rail transit would be a major component of the transportation system, providing opportunities for dense mixed-use nodes near transit stations. This growth concept offers a high level of opportunity to develop unique urban environments and to provide an alternative transportation system that is not almost exclusively dependent upon the automobile. Therefore, this scenario would likely do well at meeting the mobility needs of an increasingly diverse and aging population, including those who lack their own vehicle, cannot drive or prefer not to do so.

Table 8.3: Summary of System Performance Measures Versus Goals and Objectives by Alternative

Goals/Objectives	Performance Measure(s)	Alternative Growth Scenarios – Evaluation Results Year 2050			
		Base Case	Infill	Activity Centers	Suburban
		Goal 1: Maintenance & Safety			
1A: Provide for the continuing maintenance needs of transportation facilities and services in the region, eliminating maintenance backlogs.	(Minimize) Daily VMT/lane mile	11,300	10,500	10,700	11,200
1B: Provide a safe and secure environment for the traveling public, addressing roadway hazards and incident response, pedestrian and bicycle safety, and transit security.	i. (Maximize) Percent of regional VMT on freeways	51%	52%	52%	49%
	ii. (Minimize) Percent severely congested freeway lane miles—PM peak	34%	30%	31%	28%
	iii. (Minimize) Percent congested intersections—PM peak	43%	37%	38%	35%
Goal 2: Access & Mobility					
2A: Maintain an acceptable and reliable level of service on the transportation systems serving the region, taking into account performance by mode and facility type.	i. (Minimize) Daily hours of delay on freeway system—PM peak	1.8 million	1.3 million	1.4 million	0.9 million
	ii. (Minimize) LOS F freeway VMT as % of total freeway VMT—PM peak	47%	41%	42%	38%
	iii. (Minimize) Percent congested intersections—PM peak	43%	37%	38%	35%
2B: Provide residents of the region with access to jobs, shopping, educational, cultural and recreational opportunities and provide employers with reasonable access to the workforce in the region.	(Minimize) Average work trip length	18.3 miles	17.2 miles	18.0 miles	18.1 miles

Table 8.3 (continued)

Goals/Objectives	Performance Measure(s)	Alternative Growth Scenarios – Evaluation Results Year 2050			
		Base Case	Infill	Activity Centers	Suburban
2C: Maintain a reasonable and reliable travel time for moving freight into, through and within the region, as well as provide high-quality access between intercity freight transportation corridors and freight terminal locations, including airport cargo facilities.	i. (Minimize) Percent severely congested freeway lane miles—PM peak	34%	30%	31%	28%
	ii. (Minimize) Percent congested intersections—PM peak	43%	37%	38%	35%
2D: Provide the people of the region with mobility options necessary to carry out their essential daily activities and support equitable access to the region's opportunities.	(Maximize) Daily transit boardings	337,000	446,000	371,000	286,000
2E: Address the mobility needs of the elderly and Title VI and Environmental Justice populations and avoid or mitigate adverse or disproportionately high impacts of transportation projects on these groups.	(Maximize) Daily transit boardings	337,000	446,000	371,000	286,000
Goal 3: Sustain the Environment					
3B: Encourage programs, projects and land use planning that reduce: dependence on single occupant vehicles, the number of trips per household, and trip lengths.	i. (Minimize) Percent of trips by single-occupant vehicle	58%	58%	58%	58%
	ii. (Minimize) Average person trip length	10.5 miles	9.8 miles	10.1 miles	10.3 miles
3C: Make transportation decisions that are compatible with air-quality conformity and water quality objectives, the sustainable preservation of key regional ecosystems and support a high quality of life.	i. (Minimize) Daily VMT	301 million	279 million	285 million	297 million
	ii. (Minimize) Daily hours of delay on freeway system—PM peak	1.8 million	1.3 million	1.4 million	0.9 million
	iii. (Minimize) Percent congested intersections—PM peak	43%	37%	38%	35%

Source: MAG 2050 HSTATS, September 2002.

The Infill concept would be the most difficult to implement because its full realization would require substantial change in laws and policies that govern development and the relationships among local jurisdictions. Implementation strategies such as urban growth boundaries and economic policies that change the relative cost of auto versus transit use may be needed. Such strategies could lead to higher housing costs.

Activity Center Concept

The Activity Center concept is characterized by the presence of several mixed-use, higher-density nodes within the metropolitan area that serve as focal points for employment and commercial activity and offer unique urban environments. These activity centers may have varying sizes, but all need to emphasize transit and non-motorized modes for internal circulation. These centers need transit as well as highway connections to the surrounding areas and the entire metropolitan area. Downtown Tempe is emerging as an example of a mixed-use activity center, despite fairly difficult roadway access.

With properly designed and economically successful centers, some vehicle trips will be eliminated and average trip lengths may be reduced. The size and location of the centers needs to be carefully coordinated with the highway and transit system to avoid concentrating congestion and to enable the centers to be economically successful.

The Activity Center concept, like the Infill scenario, does not necessarily mesh well with the existing and planned street, freeway or transit system. Except in downtowns with denser street networks, the major roadway system is primarily a uniform grid that does not provide the transportation focus needed to support transit-oriented activity centers. Downtown Phoenix and downtown Tempe/ASU are perhaps the only locations where there is a convergence of freeway and transit service and sufficient density of major land uses to support a large activity center. Other downtowns such as in Mesa, Scottsdale, Glendale, and Chandler currently lack sufficient transit service (and some lack freeway service) to provide the transportation advantages of major activity centers. This could change in the future, however, with extension of the regional high-capacity transit system to serve these downtowns. The residential portion of the activity mix may be particularly challenging in older activity centers given the age of the housing stock, quality of public schools and other socioeconomic factors. Outside the traditional downtowns, master planned developments in the greater Phoenix area tend to spatially separate land uses and offer an uncongenial environment for transit service.

Establishment of activity centers within existing developed areas is challenging. Residents of adjacent neighborhoods often resist increasing density to the point needed to support activity centers. The constraints of existing development and infrastructure reduce the potential for activity center development. Given supportive public policy, however, construction of a new fixed guideway transit system can be a sufficient trigger to allow activity center development around stations. The general plans of several cities contain provisions for future development organized around activity centers.

Newly developing or planned activity centers in suburban locations need to have a level of arterial and highway access that makes them more attractive for employment and commercial activity than other areas. The planned activity centers need a sufficiently dense network of streets to avoid the concentration of traffic at a few major intersections that simply cannot handle the traffic needs of a fully developed center. The density of the activity center needs to be adequate to promote walking and bicycle trips within it. Much like traditional downtown areas, the activity center needs to be a focal point for transit service, so that circulator transit systems can relieve some of the burden on local streets in the area.

Suburban Growth Concept

The Suburban growth concept is characterized by continued outward spread of the metropolitan area at current densities, with employment and commercial activities scattered throughout the area. The analyses indicate that this concept would result in the least traffic congestion and the least transit usage. Suburban Growth would tend to require construction of the most miles of new freeways and arterials to serve the geographically larger urban area.

This growth concept is the most similar to the pattern of growth that has occurred in the Greater Phoenix area over the past several decades. This pattern promotes the spread of relatively affordable single-family detached housing, which appears to be a highly attractive option in the housing market. The pattern can also provide opportunities for short work and shopping trips if a favorable jobs/housing balance is maintained and residents choose to live near work and to shop near home.

With this growth concept, however, people may tend to choose housing locations on the basis of price, amenities or proximity to friends and relatives. Most trips must be made via automobiles, which enable residents to access jobs and other destinations throughout the metropolitan area. VMT per capita would rise as the urbanized area expands and people have more choices of destination. The viability of this concept therefore depends on the provision and continuous expansion of a comprehensive regional freeway and arterial system.

This growth concept may provide the least opportunity to create unique urban environments. It also creates the greatest likelihood that older central residential areas will deteriorate with neither replacement nor restoration. The tendency exists to move to newer areas and leave the old behind.

This concept is relatively easy to implement because it is generally similar to what has occurred in the past. For some jurisdictions, no major change in policy or direction is required to achieve this growth pattern.

The results of these analyses indicate that a more coordinated regional approach to the preparation of general plans could benefit the transportation system in the region. Elements that could be focused on include the following: more cooperation between adjacent cities to plan compatible land uses; improvement in the balance of residents and employment in each subregion regardless of jurisdiction; avoidance of excessive concentrations of employment activities where the transportation system cannot support them; and avoidance of new large growth areas that cannot be adequately served by a feasible transportation system.

Table 8.4 summarizes major advantages and disadvantages of each long-range growth concept.

Table 8.4: Advantages and Disadvantages of Alternative Growth Concepts

Concept	Advantages	Disadvantages
Base Case (General Plan)	Allows jurisdictions to follow existing plans and policies More controlled and orderly growth than with Suburban concept	Results in the highest levels of roadway congestion Does little to restrain growth in VMT
Infill	Maximizes use and effectiveness of transit and non-motorized modes Results in less overall roadway congestion than Activity Center or Base Case Promotes development of unique urban environments Improves mobility options more than any other concept	Difficult to implement given current development patterns and government structure Requires substantial investments in improving existing central-area roads May tend to raise housing costs in the region
Activity Center	Envisioned in the general plans of several MAG member jurisdictions Helps to meet the demand for unique urban places True mixed-use centers tend to reduce VMT and trip lengths Lends itself to effective external (regional) and internal transit	Results in more roadway congestion than other alternatives, except base case Few existing examples in Maricopa County Requires significant policy changes, though less than Infill
Suburban	Generally results in the least roadway congestion Easy to implement—similar to existing development patterns Enables market to maximize moderate-cost single family housing Allows people to choose housing near (suburban) workplaces	Not conducive to effective transit service or usage Maximizes the need to extend roadway networks Tends to result in higher overall VMT Associated with negative impacts of sprawl and urban blight

9.0 LONG RANGE TRANSPORTATION NEEDS

In Chapter 8.0, a greatly expanded future (year 2050) transportation system was assumed in order to analyze transportation impacts of the alternative growth scenarios. In this chapter, future needs are assessed in relation to the current plans for roadway and transit systems. Information from recent MAG model runs, the MAG Long Range Transportation Plan (LRTP), and the Federal Transit Administration's National Transit Database is applied to the assessment of long-range transportation needs. Roadway needs are assessed in Section 9.1 and transit needs in Section 9.2. Because of inherent differences between the two modes and the types of data used to measure system size and performance, different methods are used to evaluate regional roadway and transit needs.

9.1 Future Roadway System Needs

In this section, long-range needs are discussed for the two types of roadways that carry over 80% of peak hour VMT: freeways and arterials. The number of lane miles per 1,000 residents is used to measure the supply of both freeways and arterials in relation to demand. Two direct measures of PM peak hour congestion are also considered: congested freeway lane miles as a percent of total freeway lane miles, and congested arterial lane miles as a percent of total arterial lane miles. "Congestion" is defined in this chapter as Level of Service E or worse; i.e., a volume/capacity ratio greater than 0.90.

MAG provided a series of new model runs to its consultant in December 2002. Each of these model runs uses the regional roadway network described in the MAG LRTP 2002 Update ("LRTP network"), along with updated socioeconomic projections for the years 2010, 2020, 2030 and 2040. As Table 9.1 shows, the LRTP network represents a marked increase in the size of the regional roadway system, with 60% more freeway lane miles and 91% more arterial lane miles than in the year 2000.

Table 9.1: Number of Roadway Lane Miles: Existing Year 2000 Versus LRTP Network

Roadway Type	Year 2000 Lane Miles	Future Lane Miles	Percent Increase
Freeways	1,993	3,197	60%
Arterials (including expressways)	10,814	20,690	91%

Source: MAG Model Update, December 2000.

Table 9.2 reports model-generated estimates for the years 2000, 2020, 2030 and 2040 for the following roadway system characteristics in Maricopa County:

Freeway lane miles per 1,000 population

Percent of freeway lane miles experiencing congestion in the PM peak hour

Arterial lane miles per 1,000 population

Percent of arterial lane miles experiencing congestion in the PM peak

All of the values shown in Table 9.2 for the years 2020, 2030 and 2040 are based on the LRTP roadway network, which is targeted for the year 2022.

The county's population is projected to grow by 69% from 2000 to 2020, and by 41% from 2020 to 2040. As a result, the number of freeway lane miles per 1,000 persons would decline by approximately one-third (from 0.64 to 0.43) between 2000 and 2040. The number of arterial lane miles per 1,000 persons would decrease by approximately one-fifth (from 3.49 to 2.81) during this period. During the same

40-year period, the percent of congested lane miles in the PM peak would increase by a factor of roughly 1.5 for freeways and 2.4 for arterials.

The potential criteria in Table 9.3 are numerical ranges whose boundaries are defined by the year 2000 and 2020 conditions of the roadway system. For freeways, the upper bound is 0.64 lane miles per 1,000 residents (year 2000) and the lower bound is 0.61 (year 2020). For arterials, the upper bound is 3.96 (year 2020) and the lower bound is 3.49 (year 2000). The upper and lower limits of these ranges are intended to approximate a reasonable range of freeway and arterial service.

Table 9.3 also incorporates the assumption that the prevalence of freeway congestion reflects the number of freeway lane miles per capita, while the prevalence of arterial congestion reflects the number of arterial lane miles per capita. For example, the range of 0.61 to 0.64 freeway lane miles per 1,000 persons corresponds to a range of 15% to 21% of the freeway system experiencing congestion during the PM peak, on the basis of the 2000 and 2020 data in Table 9.2. Similarly, a range of 3.49 to 3.96 arterial lane miles per 1,000 persons corresponds to approximately 10% of arterial lane miles experiencing congestion in the PM peak.

Having established these criteria for the freeway and arterial systems, it is now possible to approximate the number of additional lane miles required in subsequent years (2030, 2040 and beyond) to bring the total size of each system within the specified range, given the projected regional population. Table 9.4 shows the number of additional freeway lane miles (beyond those in the MAG LRTP network) needed in the years 2030, 2040 and 2050. The calculations for 2050 assume a regional population of 9.17 million, as presented in the Base Case growth scenario (Chapter 8.0). To keep pace with population growth, the regional freeway system specified in the LRTP would require considerable expansion from 2020 to 2030. Even larger increases in lane miles would be required from 2030 to 2040, and from 2040 to 2050.

Table 9.5 applies similar reasoning to show the number of additional arterial lane miles needed, beyond those in the LRTP network, to provide an adequate regional system after 2020. As with the freeway system, additional expansion of the system would be required during each decade from 2020 to 2050.

The required geographic distribution of these additional lane miles will depend on the location and density of regional growth over the next 50 years. Under the Infill or Activity Center scenario (Chapter 8.0), many of the necessary lane miles would consist of additional lanes on existing facilities, particularly inside the SR 101 loop. Under the Base Case or Suburban Growth scenario, many of the additional lane miles would be constructed in newly urbanizing areas on the fringe of the region.

9.2 Future Transit System Needs

9.2.1 Overview

In this section, long-range transit needs are addressed by comparing existing and future service in the Phoenix metropolitan area with today's service in two metropolitan areas: Chicago and Los Angeles. The Chicago metro area's current population is very close to the assumed 2050 MAG total of 9.17 million (under the Base Case growth scenario from Chapter 8.0), while the Los Angeles metro population is 79% larger, at 16.37 million. Each region has, or will have, two main types of transit service: conventional bus and fixed guideway. The latter consists primarily of urban and commuter rail but could also include bus rapid transit service using dedicated busways or bus lanes.

Table 9.2: Selected MAG Freeway and Arterial System Characteristics, 2000-2040

Year	Population	Freeways		Arterials (including expressways)	
		Lane Miles per 1,000 Pop	% of Lane Miles Congested* (PM Peak)	Lane Miles per 1,000 Pop	% of Lane Miles Congested* (PM Peak)
2000	3.10 million	0.64	15%	3.49	10%
2020	5.23 million	0.61**	21%	3.96**	10%
2030	6.30 million	0.51**	31%	3.28**	22%
2040	7.36 million	0.43**	38%	2.81**	34%

*Level of Service E or F (volume/capacity ratio > 0.90).

**With MAG LRTP roadway network in place.

Sources: MAG "Total Population by MPA," revised December 2002; MAG PM peak hour model runs, "2000 automatic w/2041 zones 12/03/02," "2020 Update SocEc Draft 2-2020," "2030 Update SocEc Draft 2-2030," "2040 Update SocEc Draft 2-2040."

Table 9.3: Potential Criteria for Extent and Performance of MAG Freeway and Arterial System

Roadway Characteristic	Objective
Freeway Lane Miles per 1,000 Population	0.61-0.64
Percent of Freeway Lane Miles Congested (PM Peak)	15%-21%
Arterial Lane Miles per 1,000 Population	3.49-3.96
Percent of Arterial Lane Miles Congested (PM Peak)	10%

Table 9.4: Future Year Requirements to Meet Freeway System Objectives

Year	Additional Freeway Lane Miles Required				Resulting Lane Miles per Resident	Estimated % Congested (PM Peak)*
	Total		% Increase over Lane Miles in LRTP Network			
	Range	Midpoint	Range	Midpoint		
2030	646-835	741	20%-26%	23%	0.61-0.64 (Table 4.3)	15%-21% (Table 4.3)
2040	1,293-1,513	1,403	40%-47%	44%	0.61-0.64 (Table 4.3)	15%-21% (Table 4.3)
2050**	2,397-2,672	2,535	75%-84%	79%	0.61-0.64 (Table 4.3)	15%-21% (Table 4.3)

*Based on the simplifying assumption that the percent of freeway lane miles congested in the PM peak is a function of freeway lane miles per capita.

**Based on projected 2050 population of 9.17 million in Base Case Growth Scenario (Chapter 8.0).

Table 9.5: Future Year Requirements to Meet Arterial System Objectives

Year	Additional Arterial Lane Miles Required				Resulting Lane Miles per Resident	Estimated % Congested (PM Peak)*
	Total		% Increase over Lane Miles in LRTP Network			
	Range	Midpoint	Range	Midpoint		
2030	1,297-4,258	2,778	6%-21%	13%	3.49-3.96 (see Table 4.3)	10% (see Table 4.3)
2040	4,996-8,456	6,726	24%-41%	33%	3.49-3.96 (see Table 4.3)	10% (see Table 4.3)
2050**	11,313-15,623	13,468	55%-76%	65%	3.49-3.96 (see Table 4.3)	10% (see Table 4.3)

*Based on the simplifying assumption that the percent of arterial lane miles congested in the PM peak is a function of arterial lane miles per capita.

**Based on projected 2050 population of 9.17 million in Base Case Growth Scenario (Chapter 8.0).

Table 9.6 lists the existing (year 2000) values of two key indicators of the amount of transit service provided in the Los Angeles, Chicago, and Phoenix urban areas. These indicators are the vehicle revenue miles of transit service per year, and the route miles (linear right-of-way miles) of fixed guideway. A transit vehicle consists of one bus or one rail car. Chicago has a large heavy rail (subway/elevated) system, Los Angeles has both heavy and light rail, and both cities have extensive commuter rail networks—although the Chicago system operates a far greater number of trains. Phoenix currently has no fixed guideway transit. The current population figures are U.S. Census Bureau 2000 totals for each metropolitan area.

Table 9.6 also shows the estimated transit vehicle revenue miles, and miles of fixed guideway, in metro Phoenix in 2022, according to the most recent (2002) LRTP Update. The fixed guideway network consists of the planned 39-mile light rail system serving Phoenix, Glendale, Tempe and Mesa. Annual bus revenue miles were calculated by tripling the existing amount of local bus service and quadrupling express bus service, as specified in the LRTP. Annual vehicle revenue miles of rail service were estimated by applying the existing number of revenue miles per route mile from the two existing light rail lines in greater Los Angeles.

Table 9.6: Vehicle Revenue Miles of Service and Miles of Fixed Guideway, by Urban Area and Year

Urban Area and Year	Vehicle Revenue Miles of Service/Year (Thousands)			Right-of-Way Miles of Fixed Guideway		
	Bus	Fixed Guideway	Total	Heavy or Light Rail	Commuter Rail	Total
Los Angeles 2000	169,100	14,600	183,700	57	385	442
Chicago 2000	99,400	94,400	193,800	103	560	663
Phoenix 2000	26,000	0	26,000	0	0	0
Phoenix 2022 (LRTP)	79,200*	4,400**	83,600	39	0	39

*Based on tripling of local bus service (96% of today's weekday service) and quadrupling of express service (4%).

**Estimated from existing ratio of vehicle revenue miles to system length, for light rail (Blue and Green lines) in Los Angeles area.

Sources: MAG and FTA National Transit Database for 2000. FTA provides data on "directional route miles," which are assumed to equal twice the right-of-way miles for a predominantly two-track system.

9.2.2 Bus Service Needs

Table 9.7 compares existing (year 2000) vehicle revenue miles of bus service per 1,000 residents. Metropolitan Los Angeles and Chicago now have roughly 23% to 29% more bus service per resident than the Phoenix area did in 2000. The table also shows regional bus service per capita in metro Phoenix for the years 2022 (based on the LRTP Update) and 2050. The 2050 figure assumes a population of 9.17 million and no added service after 2022. Under this transit service scenario, Phoenix moves ahead of today's bus service levels in the other two cities by 2022, but again lags behind by 2050.

Table 9.7: Comparison of Regional Bus Service Per 1,000 Residents

Urban Area and Year	Metro Area Population (in millions)	Annual Vehicle Revenue Miles of Service per 1,000 Residents
Los Angeles 2000	16.37	10,300
Chicago 2000	9.16	10,800
Phoenix 2000	3.10	8,400
Phoenix 2022 (<i>with LRTP transit system</i>)*	5.44	14,600
Phoenix 2050 (<i>with 2022 LRTP transit system</i>)	9.17	8,600

*2022 MAG population estimate obtained by linear interpolation between 2020 and 2030 forecasts (see Table 4.2).

Source: FTA National Transit Database for 2000 and MAG.

Table 9.8 shows the amount of additional bus service that would be needed to bring the amount of Phoenix-area bus service per capita in 2050 up to the level currently available in Chicago or Los Angeles. The number of revenue miles in the 2025 LRTP system would have to be increased by 26% to provide a year 2050 service level comparable to what Chicago has today, or by 20% to match the current service per capita in Los Angeles. Total service in Phoenix would have to increase from 79,000 revenue miles in the year 2022 to approximately 95,000 by 2050 to match the current level of bus service in Los Angeles, or 99,000 to match the current level in Chicago.

Table 9.8: Additional Bus Service Required in Phoenix Urban Area 2050 to Match Other Cities' Year 2000 Levels

Comparison Urban Area	Thousands of Annual Revenue Miles of Bus Service Required to Match (Los Angeles or Chicago) Service Level Per Capita	
	Additional MAG-Region Bus Service	Total MAG-Region Bus Service
Los Angeles 2000	15,600 (20% increase)	94,800
Chicago 2000	20,200 (26% increase)	99,400

9.2.3 Fixed Guideway Service Needs

Table 9.9 shows the current level of urban (light plus heavy) and commuter rail service per capita in Los Angeles and Chicago. The Chicago area boasts more than ten times as much rail service per capita as Los Angeles, even though it has just 50% more route miles. With the currently planned 39-mile light rail system in place, the Phoenix area in 2022 would have nearly as much rail service per resident as greater Los Angeles does today. Without additional fixed guideway routes by 2050, however, vehicle revenue miles per capita would fall from approximately 800 to 500. These additional routes would be needed to equal or exceed the year 2000 intensity of service in the Los Angeles area.

Table 9.9: Comparison of Regional Fixed Guideway Transit Service Per 1,000 Residents

Urban Area and Year	Annual Vehicle Revenue Miles of Service per 1,000 Residents		
	Light + Heavy Rail	Commuter Rail	Total
Los Angeles 2000	500	400	900
Chicago 2000	6,000	4,200	10,200
Phoenix 2022—with planned LRTP transit system	800	0	800
Phoenix 2050—with planned 2022 LRTP transit system	500	0	500

Source: National Transit Database for 2000.

Table 9.10 lists ten generalized corridors—above and beyond the planned 39-mile system—that may be suitable for light rail and/or busway rapid transit within the next 50 years. The majority of these corridors are illustrated in the Executive Summary of the Draft MAG LRTP Update for 2002. Some corridors would further extend the Central Phoenix/East Valley LRT line, some would connect to it, and a few would replace or enhance the BRT service that the City of Phoenix will implement in selected corridors beginning in 2003. One peripheral corridor, along SR 101 connecting the Arrowhead, I-17/Deer Valley, Desert Ridge and Scottsdale Road/SR 101 regional activity centers, is also included. Overall, these ten potential corridors would add 129 miles to the regional fixed guideway network, thereby more than quadrupling the currently planned 39-mile system.

Table 9.11 lists potential commuter rail routes that could initiate service by 2050. These five routes—the BNSF northwest line, the UP east and west lines, and the UP Tempe and Chandler branches—total approximately 102 right-of-way miles. Annual vehicle revenue miles of commuter rail service were estimated by applying the existing number of revenue miles per route mile from the Los Angeles Metrolink system. (Chicago’s Metra commuter rail system operates extensive off-peak and weekend service on many routes; a Phoenix-area system is expected to more closely resemble Metrolink in focusing on peak period trips.)

If all of the potential rail/busway corridors listed in Table 9.10 are implemented, with an intensity of service similar to that of Los Angeles’s existing light rail systems, then greater Phoenix by 2050 will have approximately 2,100 annual vehicle revenue miles of urban fixed guideway service per 1,000 residents. Similarly, if commuter rail operates on all the potential routes listed in Table 9.11, Phoenix will have approximately 200 annual vehicle revenue miles of such service per 1,000 residents. The greater Phoenix total of 2,300 would be nearly 2.5 times as high as the existing level of 900 in Los Angeles, but little more than one-fifth of the current 10,200 in Chicago (Table 9.9).

Table 9.10: Potential Year 2050 Extensions to MAG Urban Fixed Guideway Transit System

LRT/BRT* Corridor	Length (Miles)	Remarks	
I-17, Metrocenter to Loop 101	5	Northern extension of planned Metrocenter LRT branch.	
SR 51, Central/Camelback area to SR 101	16	Connects with CP/EV—possible interline.	
South Central Avenue, Downtown Phoenix to Southern Avenue	4	Could replace City of Phoenix BRT.	
I-10, Downtown Phoenix to Litchfield Road	18	Could use bus station at Central/I-10.	
I-10, Downtown Phoenix to Chandler Boulevard	18	Could use bus station at Central/I-10.	
Arizona Avenue, Southern Avenue to Chandler Boulevard	6	Extension from east end of CP/EV. Subject to change based on Chandler MIS now in progress.	
Main Street (Mesa), Mesa Drive to Superstition Springs Mall	10	Extension from east end of CP/EV.	
Scottsdale/Rural Road, SR 101 to Elliot Road	22	Would interline with CP/EV in or near Downtown Tempe.	
Grand Avenue/83 rd Avenue, Downtown Glendale-Arrowhead Towne Center	8	Extension of planned Glendale LRT branch.	
SR 101, Scottsdale Road-Arrowhead Towne Center	22	Peripheral connector.	
LRT/BRT Totals	Length (Miles)	Estimated Vehicle Revenue Miles/Year	
		Total (000)	Per 1,000 Residents (year 2050)
<i>All LRT/BRT Extensions (beyond 39-mile planned LRT system)</i>	<i>129</i>	<i>14,600</i>	<i>1,600</i>
<i>Entire LRT/BRT System</i>	<i>168</i>	<i>19,000</i>	<i>2,100</i>

Note: corridors are not listed in order of importance or merit.

*In this column, "BRT" refers to a high-capacity system providing all-day service in dedicated lanes, not part-time service on freeway (or arterial) HOV lanes shared with other vehicles.

Source: MAG LRTP 2002 Update Executive Summary (May 2002 Draft).

Table 9.11: Potential Year 2050 MAG Commuter Rail System

Commuter Rail Corridor	Length (Miles)	Remarks	
BNSF RR, Downtown Phoenix to SR 303	26	BNSF northwest line.	
Union Pacific RR, Downtown Phoenix to Williams Gateway	29	UP east line.	
Union Pacific RR, Downtown Phoenix to Buckeye	31	UP west line.	
UP Tempe Branch, Downtown Tempe to Chandler Boulevard	8	Commuter rail branch.	
UP Chandler Branch, Baseline Road to Queen Creek Road	8	Commuter rail branch.	
Total	Length (miles)	Estimated Vehicle Revenue Miles/Year	
		Total (000)	Per 1,000 Residents (year 2050)
<i>Commuter Rail System</i>	<i>102</i>	<i>1,700*</i>	<i>200</i>

Note: corridors are not listed in order of importance or merit.

*Estimated from existing ratio of vehicle revenue miles to directional route miles, for commuter rail system (Metrolink) in Los Angeles area.

The comparative analysis of fixed guideway transit suggests that even with large-scale transit investment, the Phoenix metropolitan area will remain much more reliant than Chicago on private automobile transportation, and hence will require more freeway and other roadway miles per capita. On the other hand, an ambitious long-term investment program will enable greater Phoenix to meet its transit needs more effectively than greater Los Angeles does today, as measured by the amount of service provided per 1,000 residents.

10.0 TRANSPORTATION PLANNING PRINCIPLES

This chapter brings Phase I of the RTP to a conclusion by providing a set of regional transportation planning principles derived from the work done for previous tasks. Each principle pertains to the topic of Multimodal Capital Investments, Revenue Enhancement, Travel Reduction, Land Use Monitoring and Management, Transportation Technology Deployment, or Transportation Planning/Policy Innovation.

Each transportation planning principle is summarized under a bullet. Sub-bullets provide illustrative statistics, examples or other elaboration of the principles. Sources of the principles and supporting data include the Expert Panel Forums; Issue Papers; Status of Regional Transportation Report; Values, Goals and Objectives; and Analysis of Alternative Growth Scenarios.

This chapter is intended as a starting point to generate further discussion about desirable directions for transportation planning and investments in the MAG area.

10.1 Multimodal Capital Investments

- Unless multimodal transportation problems are addressed, mobility and accessibility will deteriorate significantly because of a severely congested highway system, placing serious constraints on the movement of people and goods in the region.
 - In the year 2001, 29% of freeway lane miles and 10% of arterial lane miles experienced substantial congestion—i.e., Level of Service E or F—during the PM peak hour.
 - By 2040, the congested percentages are forecast to increase to 68% for freeway lane miles and 42% for arterial lane miles. These increases will occur despite an expected increase of approximately 40% in both freeway and arterial lane miles between 2001 and 2040.
- Streets and highways are the prime carriers of travel in the region and will continue to serve this function for the foreseeable future. The major portion of future increases in travel demand will be carried by this mode.
 - Today, approximately 99% of all trips are made in single- or multiple-occupant private vehicles.
 - This overall percentage is expected to remain virtually unchanged in the year 2040—although the percent using multi-occupant vehicles is expected to rise slightly.
 - However, the development of high-capacity transit, especially rail, may have an effect on mode split during peak periods, when most congestion occurs.
- Transit serves the basic travel needs of many people who are dependent on transit as their sole or primary means of transportation. It also serves as an attractive mode for those who prefer not to rely solely on the automobile and desire lifestyle alternatives where a car may be optional.
 - Approximately four-fifths of current riders on local bus routes are transit dependent.
 - In contrast, over 90% of express bus riders have one or more vehicles at home. Rapid bus and light rail systems currently under design are expected to attract many more “choice” riders.

- The number of transit passenger miles in the MAG area is projected to more than triple from 2001 to 2025.
- Freight transportation represents a critical component in the economic growth of the region. Partnerships at the regional level with users and providers of freight transportation services will facilitate future improvements to the goods movement system.
 - Ongoing issues that MAG will continue to address in cooperation with ADOT and other agencies include CANAMEX corridor freight traffic and the widespread use of regional highways by Mexican trucks as permitted by NAFTA.
- Airports are key economic engines in the region and aviation system planning at the regional level is essential for their development and efficient operation.
 - From 1987 to 1997, Sky Harbor's national ranking in annual commercial aircraft boardings rose from fourteenth to eighth; the absolute number increased by about two-thirds.
 - Annual commercial boardings are projected to triple in the next 40 years (pre-9/11/01 estimate). Air cargo tonnage is projected to increase by a factor of 18 during the same period.
- Bicycle and pedestrian options provide mobility for many people, especially in higher density, mixed-use neighborhoods. These modes are important elements of the comprehensive transportation planning process.
 - MAG has developed the Pedestrian 2000 Plan, Regional Off Street System Plan and Regional Bicycle System Plan to help guide planning and development of non-motorized modes.
 - As mixed-use master planned communities have become a prevalent development style in the region since the 1980s, pedestrian trail systems have become a valued amenity, for linkages between homes, commercial nodes and educational facilities, as well as for recreation. The development community has begun to explore pathway systems to accommodate other alternative modes (e.g., neighborhood electric vehicles) in some of the latest projects.

10.2 Revenue Enhancement

- Continuing and reliable sources of funding to meet transportation needs in the region are essential to keep pace with projected growth, as well as to develop and maintain the transportation network in a cost-effective manner.
 - Completion of all transportation investments in the MAG Long Range Transportation Plan for 2000-2020 will cost an estimated \$23.5 billion, of which over \$9 billion will have to come from sources not currently in place. Such sources could include an extension of the current half-cent sales tax and an increase in the state gasoline tax.
 - For the period 2000-2040, this gap between financial needs and committed resources is projected to increase to \$20 billion.

- Rapid population growth and the need for modal options call for regional funding sources that increase in proportion to population growth and allow flexibility in meeting needs across all modes.
 - The Highway User Revenue Fund, by far the largest source of local transportation funding in Arizona, is constitutionally restricted to street and highway purposes.
 - Beyond the current existing countywide half-cent sales tax, which expires at the end of 2005, no statutory authority currently exists for a regional source of transportation funding in Maricopa County.
 - Several of the largest cities—especially Glendale, Phoenix and Tempe—have taken the initiative in making transit and other transportation investments that benefit both the city and the region.
 - The major funding sources for transportation in Arizona, such as the gasoline tax, are not indexed for inflation. Revenue increases due to population growth tend to be counterbalanced by factors such as improving vehicle fuel efficiency and increasing use of alternative fuels.
- The entire region’s population and economy benefit from transportation improvements. A variety of revenue options to fund transportation in the region merit continuing consideration, including non-user-based and user-based sources, as well as non-traditional sources such as charges tied to specific corridors or services.
 - While many potential new funding sources for transportation have been identified, only a few have the potential to raise large amounts of revenue. Chief among these are dedicated sales taxes and increased (or indexed) gas/use fuel taxes.
- Federal and state funding represent significant sources for transportation improvements and maximizing their use is essential to address regional needs and priorities.
 - Federal sources account for 9% of street and highway project funding, and 39% of transit project funding, in the MAG Transportation Improvement Project for fiscal years 2002 through 2006.

10.3 Travel Reduction

- Increasing the capacity of the street and highway system, alone, will not solve future congestion problems. Investments are needed that produce incentives for travelers to share rides, use transit, travel outside of peak periods or eliminate trips.
 - Currently, over 1,300 employers representing approximately 480,000 employees and students participate in the Maricopa County Trip Reduction Program, which makes use of a variety of strategies and incentives to reduce the number of work-related vehicle trips.
- While not reducing travel directly, more efficient use of existing facilities can help reduce the need to invest in new facilities.
 - Improved efficiency of roadway use can result from private behavior as well as public policy actions. From 1985 to 2000, the capacity of a typical freeway lane, as reported in the *Highway Capacity Manual*, increased from 2,000 to 2,300 passenger cars per hour per lane.

This change occurred as motorists became willing to accept shorter gaps between vehicles operating at high speeds.

10.4 Land Use Monitoring and Management

- Appropriately coordinated land use patterns and the regional transportation system can help reduce travel demand and increase travel by alternative modes. The transportation system, in turn, can constitute a critical support to implementation of a region's development vision.
 - An assessment of the planned 20-year regional land use patterns resulting from general plan updates (in conformance with state Growing Smarter Plus legislation) identifies 20 to 30 regional activity centers that could readily support alternative mode circulation within their areas of influence, as well as between cities.
 - According to a study of Transit and Urban Form by the Transportation Research Board, experience in North and South America has shown that transit can play the strongest role in providing regional access and supporting development if it is part of an overall regional vision, if it links compact activity centers, if supportive land use and design policies exist to strengthen and sustain station area development, and if commitments are made to high-quality transit service. Because of the current climate of residential and employment suburbanization, automobile dependence, and limited funding for transit, such a program requires political leadership, innovative and cooperative agency relationships, a good public relations campaign, and the patience to wait for long-term results.
- Land use planning is most effectively conducted at the local level within a common set of state or regional guidelines, and coordinated through continuing communication at the regional level. These elements can ensure coordination and concurrence among adjacent jurisdictions, and provide an intergovernmental process to review planned projects of regional significance.
 - The recently enacted Growing Smarter and Growing Smarter Plus legislation in Arizona requires all communities with a population greater than 10,000, as well as those with a population over 2,500 and a growth rate greater than 2%, to adopt updated general plans with seven required elements, review at the regional level and coordination with adjacent municipalities. All other incorporated communities must update their general plans with two required elements, plus regional review and coordination with adjacent municipalities.
 - Some cities in the MAG region have begun to enter into revenue sharing initiatives (i.e., Tempe and Chandler in the I-10 corridor, and most recently Mesa and Gilbert).
- A commitment to establishing a strong relationship between transportation and land use, through development standards and local incentives, can result in significant mixed use development surrounding light rail and bus rapid transit stations. Such development can contribute to community revitalization, offer alternative residential opportunities and boost transit ridership.

10.5 Transportation Technology Deployment

- New technologies offer the potential to reduce the need to travel, make the traveler more knowledgeable and enable the transportation system to operate more efficiently.
 - MAG's recent ITS Strategic Plan Update recommends \$325 million for systems deployment and expansion in the region.

- In addition to ITS, continuing development of automotive technology promises further improvement in pollutant emissions and fuel efficiency per vehicle mile of travel.
- A centralized, regional clearinghouse for information and coordination of initiatives between jurisdictions is required to maximize the benefits of new transportation technologies.

10.6 Transportation Planning/Policy Innovation

- The transportation planning process is most effective when it adapts to changes and trends in society and takes advantage of new planning techniques.
 - MAG has analyzed the relative advantages, disadvantages and traffic impacts of four growth scenarios for the first half of the 21st Century. These scenarios were designed to reflect possibilities ranging from continuation of existing trends to major changes in the direction and management of regional growth.
 - MAG's response to social change includes intensified efforts to understand and meet the mobility needs of an aging population, as well as linkage of transportation and human services planning.
- Regional decision-making is essential for the development of the multimodal transportation network and is best conducted through a planning process where all jurisdictions sit at the table to establish needs and priorities.
 - MAG and other planning agencies will continue to explore and implement innovative partnerships to meet specific needs. Examples include the joint MAG/ADOT CANAMEX Corridor Study (recently completed), and the coordination of the MAG High Capacity Transit Study with the RPTA Regional Transit System Study (which complements the MAG study by focusing on bus, paratransit and rideshare modes).
 - MAG is working with cities (e.g., Scottsdale/Tempe, Chandler) to study expansion opportunities for the regional fixed guideway transit system, and to ensure that local concerns and considerations are appropriately addressed at the regional level.